Rocky Intertidal Community Monitoring

1999 Annual Report

CHANNEL ISLANDS NATIONAL PARK

National Park Service
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Technical Report
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Abstract

The 1999 results are presented for the Channel Islands National Park Rocky Intertidal Monitoring Program. The program includes 21 monitoring sites established between 1982 and 1994 that have been monitored biannually since. These sites represent different exposures and rock types covering all five park islands. This reports covers sampling during the spring and fall sampling seasons in 1999. Sixteen sites were sampled between March and June (spring) and 18 of the sites were sampled between October and January (fall) 2000. Some sites were not sampled in the spring to avoid disturbance of harbor seal pups or nesting Brown Pelicans, and poor weather conditions prevented some sampling in the fall. Sampling was conducted at the islands during 12 separate sampling events including 40 days of fieldwork and travel. Permanent photoplots were monitored for changes in percent cover of selected indicator organisms. Presence/absence, abundance (density) and size distributions of black abalone, *Haliotis cracherodii*, and owl limpets, *Lottia gigantea*, were taken in both fixed plots and in timed searches. Seastar (generally *Pisaster ochraceus*) abundance was measured in timed searches or fixed transects. Temperature loggers collected data at seven sites.

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Executive Summary

This report summarizes the 1999 sampling year efforts and findings of the Rocky Intertidal Monitoring Program and serves as a record of the data and monitoring events for the year. In 1999, rocky intertidal monitoring was conducted at least once at 20 of 21 established sites on the five islands in Channel Islands National Park. We were unable to visit the Sea Lion Rookery site because western brown pelicans had already begun nesting on the slopes above the site when we visited the island. Harbor seals with pups at the site prevented us from monitoring at Harris point in the spring and inclement weather delayed fall sampling, affecting our schedule and eliminating opportunities to work at Scorpion Rock and Orizaba Cove.

Following one of the largest El Niño events on record in 1997-1998, the ocean conditions of 1999 were the coldest in a decade. Algal growth was generally good and euphusids were found washed up on beaches but few other changes were noted.

Compete photoplot data are presented in Appendix A. This year we begin reporting an expanded list of key species to include all those monitored at Santa Cruz Island. The red alga, *Porphyra perforata*, was abundant at several sites, especially on Anacapa and Santa Cruz Islands where it obscured some of the key species and made it difficult to search for owl limpets. Barnacle, rockweed, and mussel cover was below the long-term mean at the majority of sites, while Endocladia was at or above the long term mean at 10 of 17 sites. There was considerable variability among plots within sites as well as among sites. Rockweeds made a strong appearance in barnacle plots at Cat Rock. Rockweeds also invaded Endocladia zone plots at Middle East Anacapa, East Point and Fossil Reef. Rockweeds did poorly within the rockweed zone at Fossil Reef and at Landing Cove.

Mobile invertebrates were counted in photoplots at nine sites as this technique continues to be refined. Mobile invertebrate count results are presented along with site details in the trip reports in Appendix D. Littorine snails and small limpets are typically the most numerous and most ubiquitous organisms. A variety of other snails and chitons were found at each site and some zonation patterns are becoming apparent.

Black abalone, *Haliotis cracherodii*, were rare in the fixed plots and a general search of each site was conducted for relative numbers. Otter Harbor had the most black abalone with 57 found in a 30 minute search. The only other sites with more than 10 abalone were Crook Point and Otter Harbor on San Miguel and Fossil Reef on Santa Rosa. Young abalone were found at Landing Cove, Crook Point, and Otter Harbor. At least two withered black abalone were found.

Fixed plots for monitoring owl limpets, *Lottia gigantea*, were established at Cat Rock and South Frenchy's Cove on Anacapa and at Fossil Reef on Santa Rosa Island. The largest owl limpets within monitoring plots were at Santa Rosa Island where roughly 60% were larger than 50 mm, Anacapa Island had the smallest size range with over 60% of the population between 30 and 50 mm. On both Santa Rosa and San Miguel Islands, the owl limpet numbers increased slightly over 1998 but were still below initial population densities.

Seastars, mostly *Pisaster ochraceus*, were present in abundance at all islands except Anacapa, though not all sites had them in abundance. No seastars were found at Cat Rock or Middle Anacapa. *Pisaster ochraceus* were abundant at Landing Cove, Willows Anchorage, East Point, Johnson's Lee, Ford Point, Fossil Reef, Crook Point and Otter Harbor. Sea star predation has impacted mussel densities at Landing Cove, Willows Anchorage, Johnson's Lee, and Fossil Reef, though the impact is often at a lower tide level than the mussel plots.

A total of 2,401 passengers visited Frenchy's Cove area at Anacapa Island in 1999 aboard concessionaire boats. Most of the visitation occurred between February and May with 79% (1,885 of 2,401) of the visitors landing in those months.

Introduction

The rocky intertidal zone is a rich and wondrous place at the meeting of marine and terrestrial habitats. Exposed to the air part of each day, the marine organisms living there must survive the drying sun and winds and occasional freshwater rains during low tide. Terrestrial animals taking advantage of the low tide to forage for food (or study the marine life) must flee the incoming tides or risk the consequences. Temperature extremes and wave force reach their maximums here at the shoreline, yet the diversity of life is high. In fact, many organisms are so well adapted to this dual lifestyle that they cannot live without the alternating exposure to both the air and sea.

Channel Islands National Park and National Marine Sanctuary encompasses the four northern Channel Islands and Santa Barbara Island off the coast of Southern California. The park islands and surrounding waters also bear designations as International Biosphere Reserve and State of California Areas of Biological Significance. The State of California maintains jurisdiction over the marine resources and manages them through the California Department of Fish and Game.

The undisturbed tide pools are one of the features specifically mentioned in the enabling legislation for Channel Islands National Park. The law establishing the park (16-USC-410) also mandated the development of inventories and monitoring of natural resources in the park. Rocky intertidal monitoring has been ongoing since 1982 with the following goals: 1) to monitor trends in population dynamics of selected indicator organisms, 2) to determine normal limits of variation, 3) to discover abnormal conditions, 4) to provide remedies for management problems, and 5) to measure the success of management actions.

This report summarizes the 1999 sampling year efforts and findings of the Rocky Intertidal Monitoring Program. All data and monitoring procedures for the year are presented here in the report and appendices. Monitoring results were previously reported in Richards 1986, 1988, and 1998, and Richards and Lerma 2000. Black abalone monitoring results have been presented in Haaker et al. 1992, Davis et al. 1992, and Richards and Davis 1993.

Methods

The Channel Islands National Park Rocky Intertidal Monitoring Program has 21 permanent sites on the five park islands (Figure 1). Sites were monitored in spring (March- June) and fall (Oct.-Jan.) of 1999-2000. Sites were established between 1982 and 1994. Site selection criteria and the monitoring protocol are detailed in Richards and Davis 1988. Additional protocol for Santa Cruz Island is detailed in Engle et al. 1998. Updated protocol summaries can be found in Richards and Lerma 2000. No changes to the protocol methods were made in 1999. Fixed, 1-m radius circle plots for monitoring owl limpets, *Lottia gigantea*, were established at Cat Rock and South Frenchy's Cove on Anacapa and at Fossil Reef on Santa Rosa Islands. Data are maintained in Microsoft Access and Excel files at Channel Islands National Park. The data (including trip reports, annual reports, and the database) reside within the CINP IM\TIDEPOOL directory.

Monitoring plots were mapped with a Trimble® Differential Geographic Positioning System (DGPS) at all five Santa Rosa Island sites, the four San Miguel Island sites, and Orizaba Cove site. Site outlines, prominent features, and all plots were recorded. Files have been downloaded into Arc View but finished maps have not been created.

Some notes on nomenclature usage: change is inevitable as species are examined and taxa lumped and split according to the experts. Older names are sometimes found to have priority and thus names get changed to reflect that. Name changes may take several years to be fully accepted and integrated into common usage. With this report we will make changes in some of the nomenclature we have used, to the most current names. The name changes of the core species are listed below.

Old name	New name
Pelvetia compress (P. fastigiata)	*Silvetia compressa*
Hesperophycus harveyanus	*Hesperophycus californicus*
Gigartina canaliculata	*Chondracanthus canaliculatus*
Gigartina spinosa	*Chondracanthus spinosus*
Gigartina leptorhynchos	*Mazzaella leptorhynchos*
Rhodoglossum affine	*Mazzaella affinis*
(most) *Collisella* spp.	*Lottia* spp.
Collisella scabra	*Macclintokia scabra*

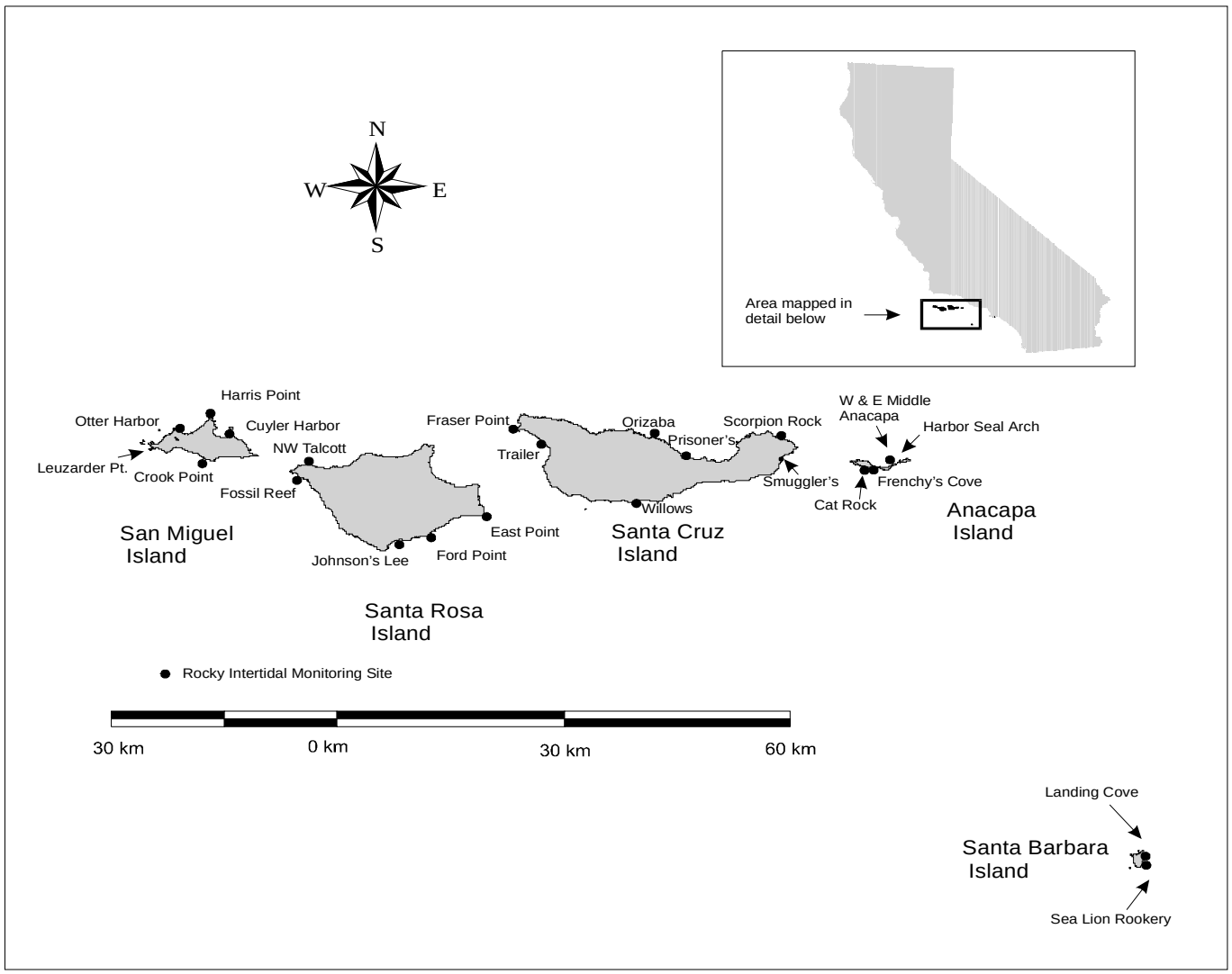


Figure 1. Rocky Intertidal Community Monitoring Site Locations in Channel Islands National Park

Results

All monitoring sites in the park were sampled at least once in 1999, except Sea Lion Rookery, Santa Barbara Island. Table 1 shows the sampling dates for each site. Specific observations and findings of the 1999 sampling efforts can be found in the trip reports for the year which follow in Appendix D. Our fall sampling period extends into January, so Santa Rosa Island (SRI) sites sampled in January 1999 were reported as part of the fall 1998 effort (Richards and Lerma 2000). Inclement weather delayed many of the fall samples until January 2000.

Table 1. 1999 Sampling dates for Rocky Intertidal Monitoring sites

Site	Site code	Spring	Fall
Cuyler Harbor, SMI	SMCH	3/18/1999	1/3/2000
Crook Point, SMI	SMCP	3/16/1999	1/5/2000
Otter Harbor, SMI	SMOH	3/17/1999	1/4/2000
Harris Point, SMI	SMHP	!	1/6/2000
Fossil Reef, SRI	SRFR	4/15/1999	1/19/2000
Johnson's Lee, SRI	SRJL	4/19/1999	1/18/2000
Ford Point, SRI	SRFP	4/14/1999	1/18/2000
Northwest-Talcott, SRI	SRNWT	4/16/1999	1/20/2000
East Point, SRI	SREP	4/18/1999	1/17/2000
Fraser Cove, SCI	SCFC	5/19/1999	12/8/1999
Trailer, SCI	SCTR	5/18/1999	12/7/1999
Willows Anchorage, SCI	SCWA	5/20/1999	12/6/1999
Scorpion Rock, SCI	SCSR	6/1/1999	#
Prisoner's Harbor, SCI	SCPH	5/21/1999	12/9/1999
Orizaba Cove, SCI	SCOC	4/24/1999	#
Cat Rock, ANI	ANCR	4/12/1999	10/25/1999
South Frenchy's Cove, ANI	ANSFC	4/13/1999	10/24/1999
Middle Anacapa-West	ANMW		11/23/1999
Middle Anacapa-East	ANME		11/23/1999
Landing Cove, SBI	SBLC	--	1/18,1/19/2000
Sea Lion Rookery, SBI	SBSLR	--	*

!harbor seal pups present, no sample; # bad weather prevented monitoring
-- no spring samples because of nesting pelicans; *unable to access the site in January due to nesting pelicans present.

Photoplots

Photoplot summary data are presented in Figures 2-4 for each indicator taxa by zone. Sample mean percent cover values for each site are compared to the range and mean of yearly cover values for all years at that site. Complete photoplot data for 1999 are presented in Appendix A. Summary tables are included in the trip reports in Appendix D. Plots were photographed with a Nikonos V camera with dual flash units. Most of the plots were scored in the field. With this report, we are now reporting a larger list of key species (Appx. A).

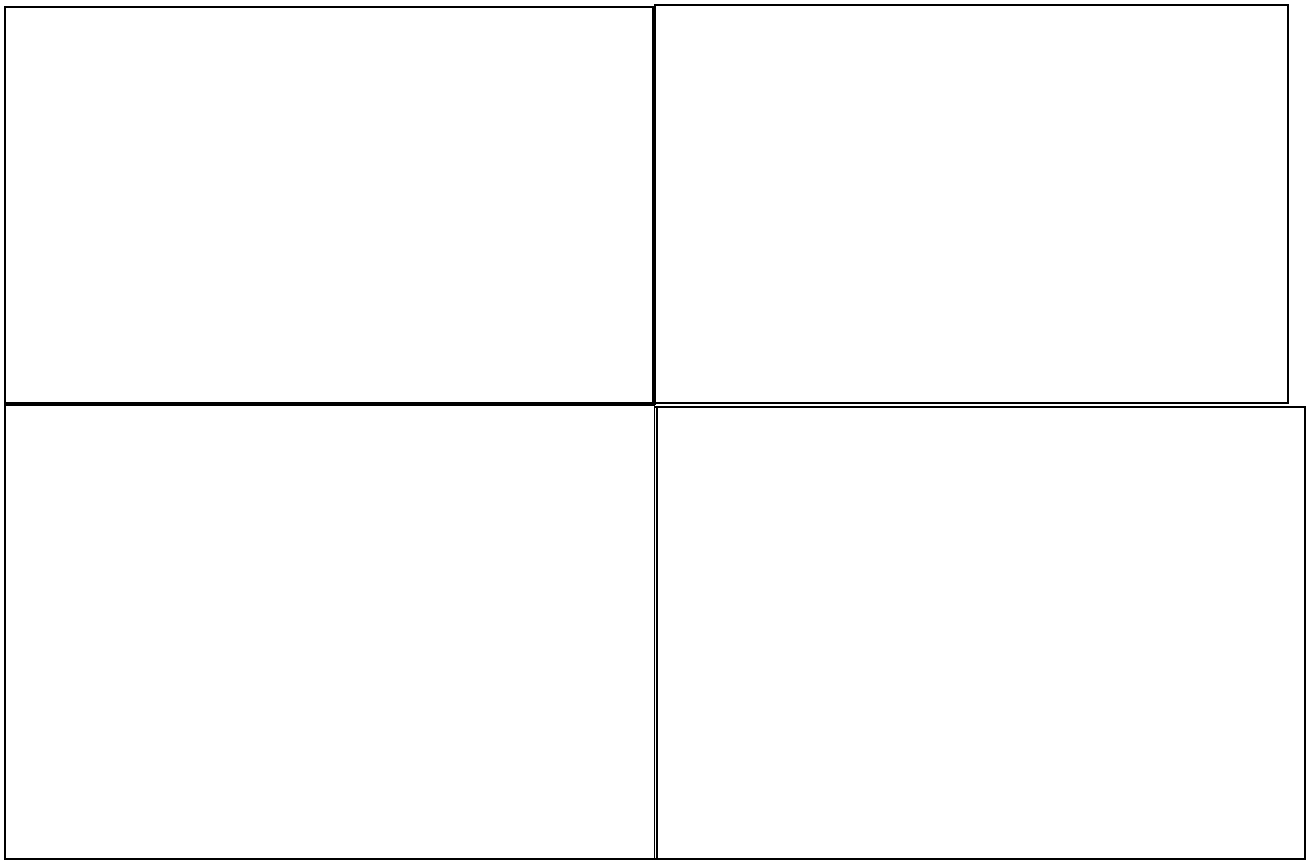
At Landing Cove, Santa Barbara Island, barnacle plots are largely dominated by *Tetraclita rubescens* in all five plots. *Chthamalus fissus/dalli* were present in most plots but only as a minor component. *Silvetia compressa* was the only rockweed present and cover has fallen to an all time low with all plots under 20% cover. In October 1995, bolts were installed on the plot corners of several plots to aid in locating them. Only one corner was found at the time for plot 326 and the new corners were placed

approximately 30° off the original plot (other corners that were buried by mussels were later found). In 1999, the old corners were located again and both plot orientations were scored in the field. The new orientation, which was entered into the database had 36% mussel cover and 18% bare rock while the original orientation had 54% mussel cover and only 6% bare rock. The area in and around this plot routinely has patches of mussels torn out; however, and one should expect variability here.

At Anacapa Island, most photoplots were within the normal range. Barnacle plots at Cat Rock however have largely been taken over by rockweeds, mostly *Hesperophycus californica* but some *Silvetia compressa* was also present. Conversely one of the rockweed plots (#55) is mostly acorn barnacles with no rockweeds present. Mussel cover at Cat Rock was low (all plots were under 45% mussel cover) but this is typical of the site. *Porphyra perforata* was abundant in the spring. Rockweeds covered a fair percentage of the Endocladia plots at Middle East Anacapa but not at Middle West except one plot. Endocladia was common in barnacle plots at both areas.

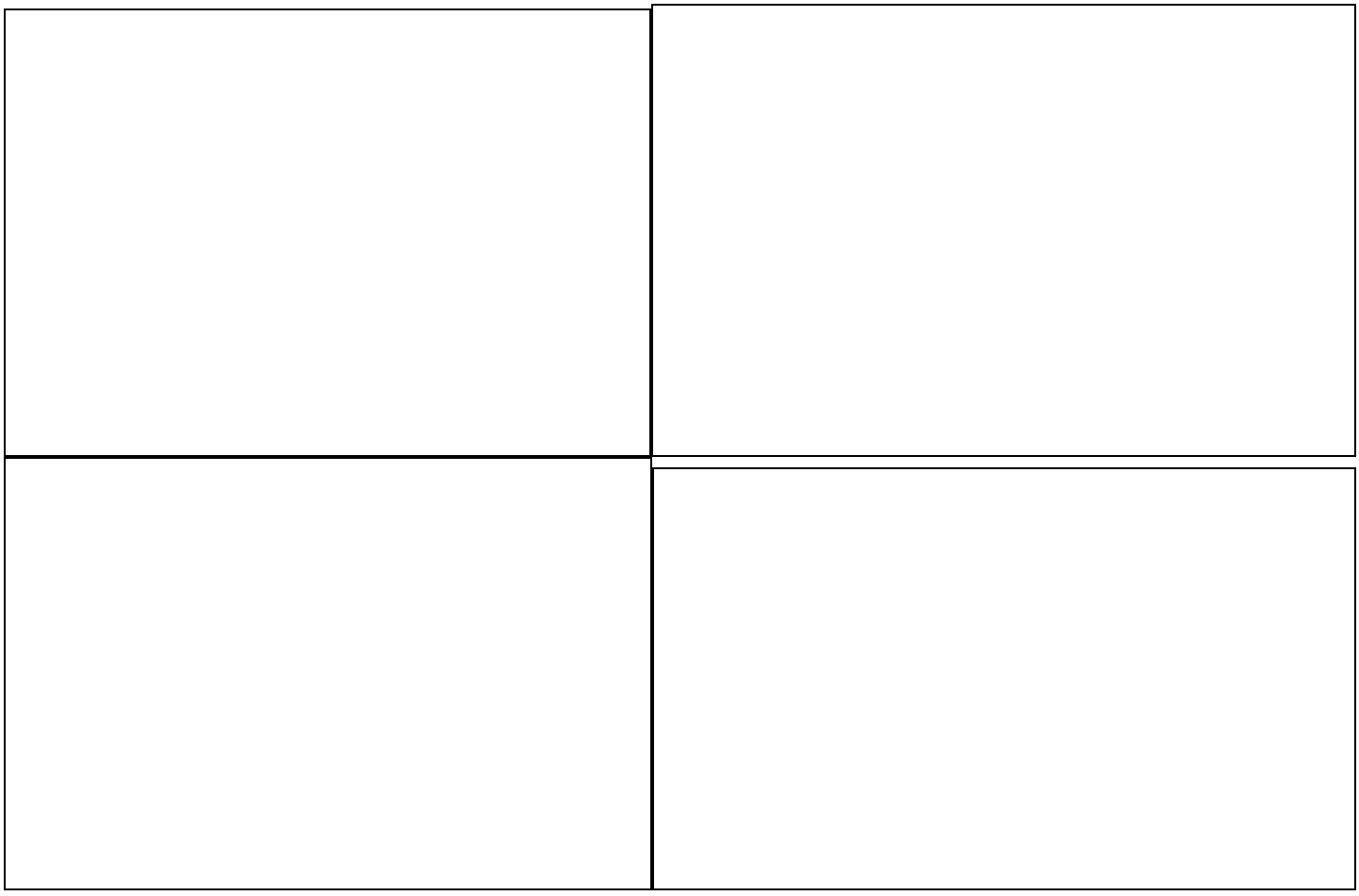
In the spring, *Porphyra perforata* was abundant at several of the Santa Cruz Island sites, present in all zones. At Fraser Cove, *Endocladia muricata* dominated several of the barnacle plots. Overall barnacle cover was low at Prisoners Harbor because one plot was buried under cobble and various algae dominated in another. The highest elevation Hesperphycus plot at Willows Anchorage was mostly bare rock with few living organisms. The plot was apparently buried by sand and scoured.

On Santa Rosa Island, *Hesperophycus californica* invaded one of the barnacle plots and was a strong presence in three of the Endocladia plots at East Point. *Endocladia muricata* was doing poorly within the plots at Fossil Reef where *Silvetia compressa* and *Balanus glandula* each dominated two plots in that zone. In other areas, *E. muricata* looked healthy, it was just limited in distribution.



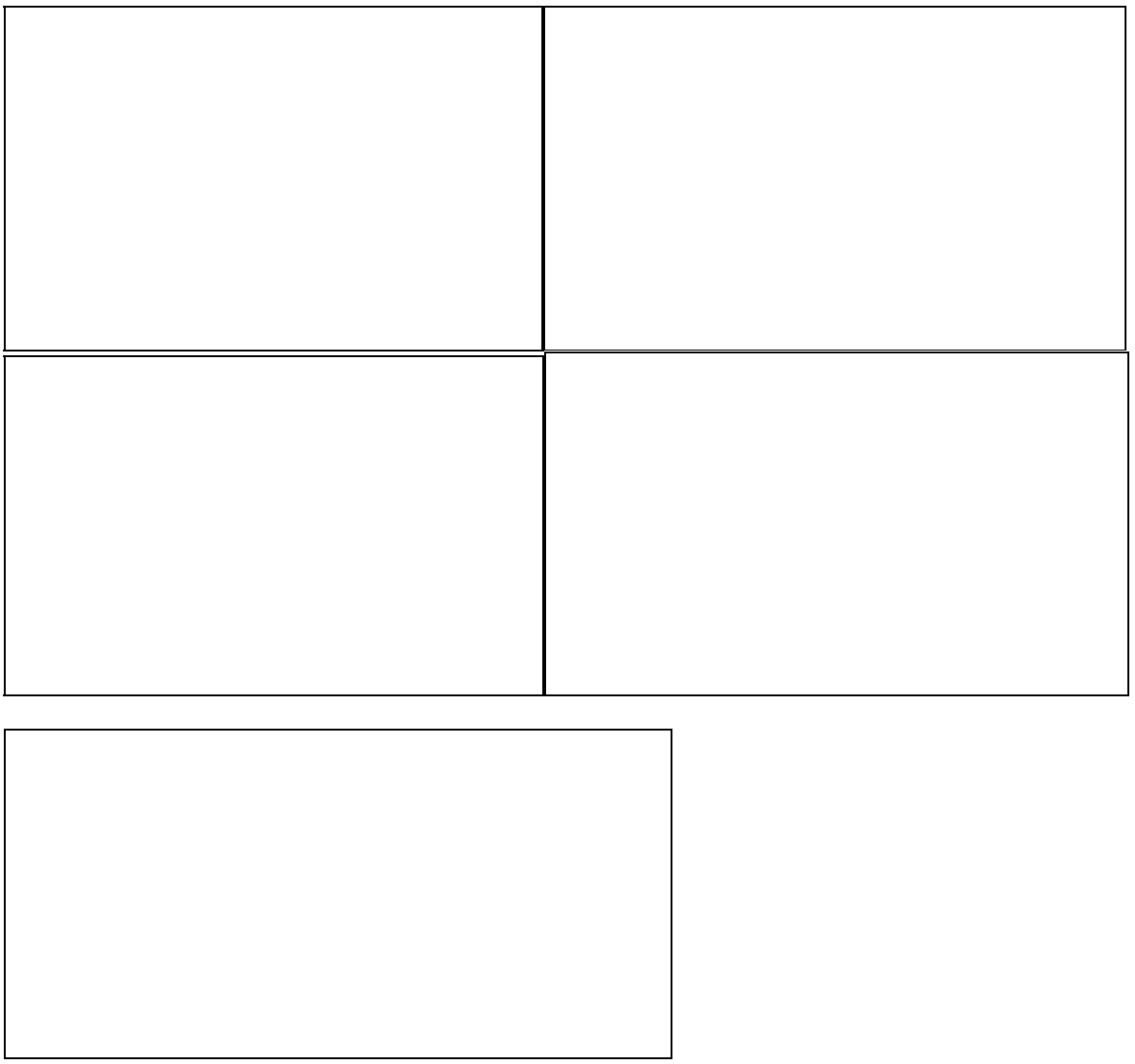
Bars represent the spring 1999 mean percent cover from five[1] plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal lines mark the overall mean for all years at that site. There is no data available for this season at sites without bars. Red algal turf is monitored only at Landing Cove. Sites: Santa Barbara Island- Landing Cove, Sea Lion Rookery; Anacapa Island- Cat Rock, Middle-East, Middle-West, South Frenchy's Cove; Santa Rosa Island- East Point, Ford Point, Fossil Reef, Johnson's Lee, Northwest-Talcott; San Miguel Island- Cuyler Harbor, Crook Point, Harris Point, Otter Harbor, Santa Cruz Island- Fraser Cove, Trailers, Willows Anchorage, Scorpion Rock, Prisoners Harbor, Orizaba Cove ([1]Cat Rock data are from nine plots, Middle East from three plots).

Figure 2. Percent cover of Taxa within fixed plots by zone, spring 1999.



Bars represent the fall 1999 mean percent cover from five[1] plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal lines mark the overall mean for all years at that site. There is no data available for this season at sites without bars. Red algal turf is monitored only at Landing Cove. 1994-Fall 1998 data for Santa Cruz Island was collected by UCSB for the Coastal Commission Nearshore Inventory. Sites: Santa Barbara Island- Landing Cove, Sea Lion Rookery; Anacapa Island- Cat Rock, Middle-East, Middle-West, South Frenchy's Cove; Santa Rosa Island- East Point, Ford Point, Fossil Reef, Johnson's Lee, Northwest-Talcott; San Miguel Island- Cuyler Harbor, Crook Point, Harris Point, Otter Harbor, Santa Cruz Island- Fraser Cove, Trailers, Willows Anchorage, Scorpion Rock, Prisoners Harbor, Orizaba Cove ([1]Cat Rock data are from nine plots, Middle East from three plots).

Figure 3. Percent cover of taxa within fixed plots by zone, fall 1999



Bars represent the 1999 mean percent cover from five[1] plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal lines mark the overall mean for all years at that site. There is no data available for this season at sites without bars. Red algal turf is monitored only at Landing Cove. Sites: Santa Barbara Island- Landing Cove, Santa Cruz Island- Fraser Cove, Trailers, Willows Anchorage, Scorpion Rock, Prisoners Harbor, Orizaba Cove ([1]Cat Rock data are from nine plots, Middle East from three plots).

Figure 4. Percent cover of taxa within fixed plots by zone, (zones not represented at all sites) 1999

Black Abalone

Results of abalone surveys are presented in Table 2. Monitoring plots were checked at all sites except Harbor Seal Arch on Middle Anacapa. The numbers within plots were very low. At each site a general search was made of the monitoring site. Some variability is inherent depending on who did the search and the tide and surge conditions. The numbers are still an indication of the general abalone population in the area.

Haliotis cracherodii were most common at Otter Harbor with over 50 found on the reef during each visit. Crook Point, Harris Point, and Fossil Reef were the only other sites to produce more than 10 abalone. No general search was made at Harris Point this year though 8 black abalone were found in the plots and five were in the seastar crevice. Four black abalone, 45-60 mm were found in mussel beds at Landing Cove. Black abalone are a rare sight at Santa Barbara Island and have always been uncommon at the Landing Cove. Two abalone were found at Northwest Talcott in the spring, this too was a rare find for recent years. Juvenile abalone were found at Otter Harbor where 13 of 50 abalone were 60 mm or less and at Crook Point where two of 17 abalone were under 40 mm. No abalone were found at Cuyler Harbor, Cat Rock, South Frenchy's Cove, Fraser Cove, or Prisoner's Harbor in 1999. No abalone were found at Middle Anacapa, though the abalone plots at Harbor Seal Arch were not checked.

Seastars

Counts of seastars in either timed searches or transects are presented in table 2. *Pisaster ochraceus* were the most commonly encountered seastars and were present in abundance at all islands except Anacapa, though not all sites had them in abundance. No seastars were found at Cat Rock, Middle Anacapa, or Fraser Cove. Large numbers of *Pisaster ochraceus* were present at Johnson's Lee and Ford Point, as has been the case for a number of years. Their presence has had a much greater apparent impact on *Mytilus californianus* cover at Johnson's Lee, than at Ford Point where most of the seastar activity has been limited to the reef below the photoplots. Seastars were not counted at Landing Cove in 1999 because of surge conditions. Seastars were also abundant at Crook Point, East Point, and Willows Anchorage. Otter Harbor also had a fair number of seastars present. No seastars were observed at Cat Rock, Middle Anacapa, or Fraser Cove.

Table 2. Seastar and black abalone searches in 1999. (-- indicates no plot or transect at the site, nc indicates no count performed, P.o.= *Pisaster ochraceus*, P.g. *P. giganteus,* A.m *Asterina miniata.***)**

Site	Seastars in 30 min	Sea stars in transects	Abalone in plots	Abalone in 30 minutes
Crook Point 3/99	86P.o.	--	9	8
Otter harbor 3/99	30 P.o.	--	0	50 (+25 after 30 min)
Cuyler harbor 3/99	13 P.o.	--	--	0
Cat Rock 4/99	0	--	0	0
S. Frenchy's Cove 4/99	2 P.o.	--	--	0
Ford Point 4/99	69 P.o.*	--	0	6
Fossil Reef 4/99	Nc	39 P.o. (30mx6m)	0	17 (+8 after 30 min)
Northwest Talcott 4/99	1 P.o.	--	0	2
Johnson's Lee 4/99	15 P.o.*	31 P.o. (10mx2m)	0	1
East Point 4/99	14 P.o.	--	0	1
Orizaba Cove 4/99	8 (no time search)	--	--	Nc
Trailer 5/99	3 P.o.	--	--	5 (+4 in add'l 20 min.)
Fraser Cove 5/99	0	--	--	0 (at both Fraser and Forney)
Willows Anchorage 5/99	27 P.o.	--	--	2
Prisoner's Harbor 5/99	2 P.o.	--	--	0
Scorpion Rock 6/99	Nc (present)	--	--	nc
S. Frenchy's Cove 10/99	1 P.o.	--	--	0
Cat Rock 10/99	0	--	--	0
Middle Anacapa 11/99	0	--	nc	0
Willows Anchorage 12/99	95 P.o.	--	--	0
Trailer 12/99	Nc! (present)	--	--	2!
Prisoner's Harbor 12/99	Nc	--	--	0
Fraser Cove 12/99	Nc!	--	--	nc
Cuyler Harbor 1/00	23 P.o.	--	--	0
Otter Harbor 1/00	32 P.o., 3 P.g., 1 A.m.	--	2	57
Crook Point 1/00	206 P.o.	11P.o.	2	22
Harris Point 1/00	29 P.o.	6 P.o.	8	Nc (5 in seastar transect)
East Point 1/00	81 P.o.	--	0	2
Johnson's Lee 1/00	601 P.o.	Nc	0	1
Ford Point 1/00	627P.o.	--	0	5
Fossil Reef 1/00	Nc	41 P.o. (30mx6m)	0	7 (+8 after 30 min)
Northwest Talcott 1/00	10 P.g.	--	0	1 (+2 after 30 min)
Landing Cove1/00	386 P.o.	32 P.o. (16x2m)	-	4

* late in tide, ! heavy surf so no timed search

Owl Limpets

Lottia gigantea were measured in fixed plots at Santa Rosa, San Miguel, Anacapa and Santa Cruz Islands. In 1999, three 1.0-m radius fixed plots were established at both Cat Rock and South Frenchy's Cove. Owl limpets occur in low densities at both of these sites and additional plots may be difficult to establish. Five fixed circle plots (1.0-m radius) were established at Fossil reef about 180 m east of the photoplot area. Plots were all located within high-density owl limpet habitat.

Combined size distributions for the fall 1999 sampling are presented in figure 6. Owl limpets at Fraser Cove were measured only in 1.0 m radius plots (Previous sampling at this site used 1.5 m radius plot –see Richards and Lerma 2000). There is a negative correlation between mean size and density at Santa Rosa Island (figure 6). One might expect to see this with reduced competition for food resources. At San Miguel Island the overall trend for the mean size decreased slightly since 1986, though not as much as the density (figure 7).

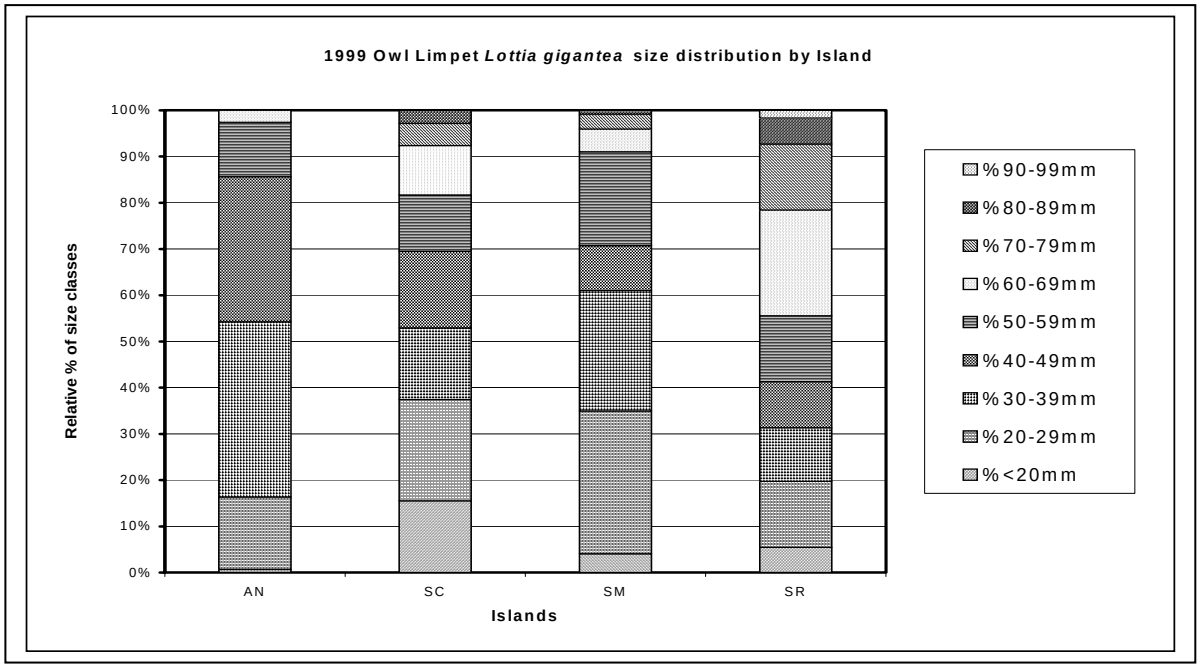


Figure 5. 1999 *Lottia gigantea* size distribution by island.

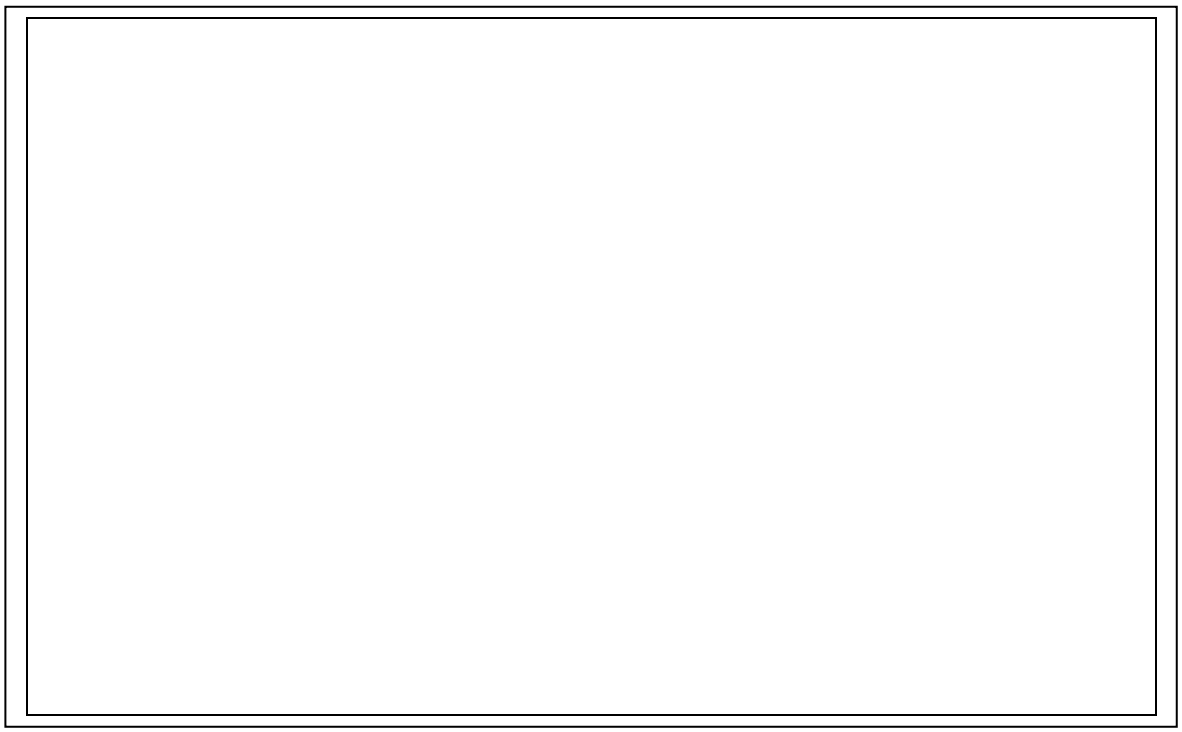


Figure 6. *Lottia gigantea* density and mean size at Santa Rosa Island 1988-1999, all sites combined.

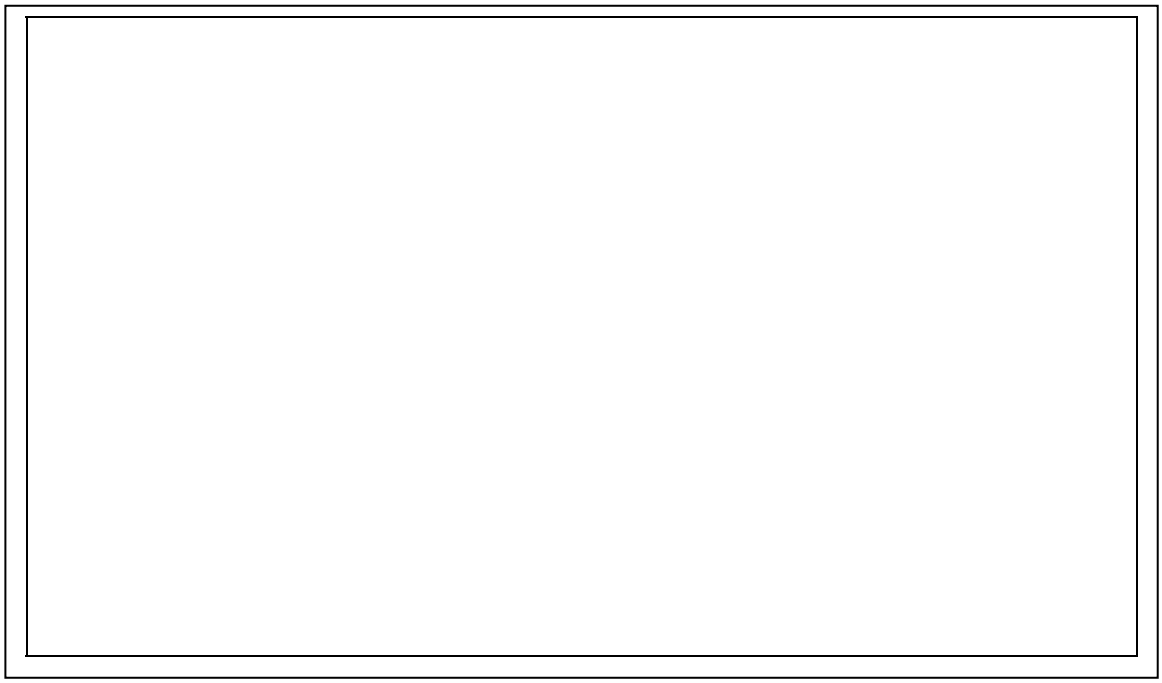


Figure 7. *Lottia gigantea* density and mean size at San Miguel Island, 1986-1999. All sites combined

Surfgrass

Surfgrass transects are established at only two sites, both on Santa Cruz Island. The 1994-1999 data still need to be incorporated into the CINP database. Engle *et al*. (*in prep*) found some seasonal variation in the surfgrass transects but little annual variation. Results from the spring and fall 1999 sampling are presented in tables 3 and 4.

Table 3. 1999 Percent cover in surfgrass transects at Fraser Cove, Santa Cruz Island.

Taxa	Transect 1		Transect 2		Transect 3	
	Spring	Fall	Spring	Fall	Spring	Fall
Rock	3	9	1	4	3	1
Sand					1	1
Egregia	17	8	6	14	1	
Endocladia					1	1
C. vancouveriensis	21	21	7	7		4
Erect coralline algae	3		3			
Encrusting Coralline				2		1
Chondracanthus canaliculatus	3		14	7	10	6
Gastroclonium sp.		1				1
Gelidium coulteri						1
Prionitis sp.			3			
Porphyra sp.	3				1	1
Non-coralline crust		1				
Mastocarpus sp.			1	2		
Other red algae	1				4	
Phyllospadix sp.	43	55	64	60	79	82
Mytilus californianus	3	4		3		
Anthopleura elegantissima	2	1	1			
Phragmatopoma	1					
Chthamalus				1		1

Table 4. Percent cover in surfgrass transects at Trailer, Santa Cruz Island

Taxa	Transect 1		Transect 2		Transect 3	
	Spring	Fall	Spring	Fall	Spring	Fall
Rock			2	2	1	3
Sand			1			
Egregia	14	2	14	4	1	
C. vancouveriensis	1	7	2	4	5	6
Erect coralline algae					1	
Encrusting Coralline	1		1			
Chondracanthus canaliculatus	6	2	3	3	7	2
Chondracanthus spinosus			5		2	1
Gastroclonium sp.		2				
Mastocarpus sp.			6		1	
Prionitis sp.			2	1	5	2
Other red algae					1	
Phyllospadix sp.	77	85	62	83	74	86
Mytilus californianus	1	2	1	1		
Phragmatopoma				2	1	
Chthamalus					1	
Tetraclita			1			

Species Diversity

Photoplot species census tables are presented in Appendix B. The censuses are simply presence/absence of species within the photoplot area, intended to show the broader species composition within each plot and zone, and are not rated for abundance. Mobile invertebrates were counted in some plots (see next section) and key algal and sessile invertebrate species percent cover was measured (Appx. A). This information is not part of the standard monitoring protocol but was conducted during the normal note taking associated with photographing and scoring the plots.

General species lists for most sites are presented in Appendix C. A complete list may not have been done at a site because of time factors. The numbers of species found at a particular site is only a relative representation of that site's diversity. Because of variability in tidal exposure and the amount of time devoted to a search, comparisons between sites should be made with caution. As in 1998, the site with the most species present was Northwest-Talcott, a site with a variety of habitat types and many turnable rocks. Presence and some counts of shore birds and marine mammals at each site are included in the species list (Appx. C.).

Mobile invertebrates

Mobile invertebrates were counted within photoplots at nine sites at Santa Rosa, San Miguel and Santa Barbara Islands in the fall sample. Tables are included within site descriptions in Appendix D. Limpets smaller than one centimeter and littorine snails were not counted in most of the plots because of their high abundance. Estimates or no counts were made of *Littorina* spp. and small limpets when there was not time. New techniques need to be worked out for this protocol. One noteworthy site for mobile invertebrates was Willows Anchorage with large numbers of *Nucella emarginata* in the mussel plots. High numbers of *N. emarginata* were present at Cuyler Harbor and Harris Point.

Visitation monitoring

Visitation numbers for Frenchy's Cove are available from monthly reports based on concessionaire (mostly Island Packers Company) reporting (Table 5). There are no records available for the number of private boaters actually going ashore there. Most of the visitation occurred between February and May with 79% (1,885 of 2,401) of the visitors landing in those months. The total number of passengers per month exceeded 500 in both March and April. The number of passengers per trip never exceeded 100 however the number of trips per day is not available. The reported Anchorage Count total for 1999 was 1584 passengers though this number is somewhat suspicious as it is nearly triple the numbers from previous years. Anchorage counts of Frenchy's Cove are from counts conducted by NPS staff stationed on Anacapa Island as part of the daily routine and include the number of both private and commercial fishing and passenger boats observed in the anchorage between 1200 and 1300hrs each day. The reported count is the number of visitors based on the number and type of boats anchored at Frenchy's Cove and is given as an indication of the potential visitation from private boaters there. The data were not consistently recorded and there is some confusion in the reporting (different anchorages were not always labeled consistently, particularly in Jan. Mar. Apr. and Nov.), but this would not account for difference, as July and October are when the highest counts occurred. July and October counts seem questionable as they are suspiciously high.

Table 5. Visitors to Frenchy's Cove, Anacapa Island in 1999. (See text for data sources and note on anchorage count)

YEAR	MONTH	#PASSENGERS	#TRIPS	Pass/trip	Anchorage count
1999	January	60	2	30	6
1999	February	276	6	46	13
1999	March	815	16	51	66
1999	April	632	11	57	127
1999	May	162	4	41	41
1999	June	0	0	0	111
1999	July	0	0	0	564
1999	August	288	4	72	104
1999	September	0	0	0	46
1999	October	0	0	0	451
1999	November	168	4	42	42
1999	December	0	0	0	13
	Total	2401	47	Avg=28.3	1584

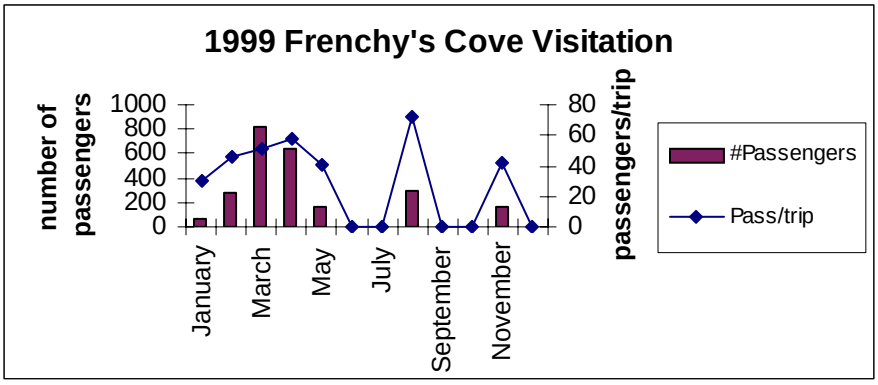


Figure 8. Visitation at Frenchy's Cove, Anacapa Island by month in 1999. Island Packers Company visitation figures only (see text).

Trip reports

These reports are included as details of the sampling work performed, data collected, weather conditions, and natural and history observations during each sampling event. The reports, completed shortly after each sampling trip are presented in Appendix D. Personnel present, summary data and explanations for missing or incomplete data are included in these reports.

Discussion

Nesting western brown pelicans, harbor seal pups, and inclement weather were factors affecting completion of all sites in 1999. Still, we continued monitoring at 21 sites on five islands. The overall program was expanded slightly with the addition of monitoring plots for owl limpets, *Lottia gigantea,* at three sites (Fossil Reef, South Frenchy's Cove and Cat Rock), giving us owl limpet monitoring plots at 9 sites on four islands. An expanded list of species monitored in the photoplots was used giving us a better picture of the community dynamics. We continued to experiment with mobile invertebrate counts as a method to understand the population dynamics of some important predators and grazers. Continued site mapping with Geographic Positioning System (GPS) was done at several sites completing mapping started in 1998 on all but Anacapa Island.

Routine maintenance is important to the long-term monitoring. The sampling is designed around fixed plots to reduce the variability. Complete loss of a plot would be the end of a data set, requiring starting over for trends there. Replacement of corner epoxy is necessary to relocate plots each visit. Overgrown corners can be difficult to locate and waste valuable field time. Three of the mussel plots at Johnson's Lee have dense colonies of *Phragmatopoma californica*, a tubeworm that grows very quickly and easily obscures epoxy markers. We have had difficulty relocating the exact orientation of one of those plots (#514) at times over the last several years. In 1999, all the corners were relocated and stainless steel bolts were installed to aid in future monitoring.

The mobile invertebrate technique deserves further analysis and effort to design a standard and workable protocol. *Littorina* spp. and small limpets are too numerous to count in the full photo plot. Nevertheless, patterns of their abundance will prove interesting. Though we have not begun to analyze fully the information from the counts, zonation patterns can be striking, and may help further define the different zones and why we see shifts in the zonation.

During the spring monitoring trip to Santa Cruz Island, we assisted USGS geologists who were collecting tar samples from the beaches. Samples are being compared with known sources to determine where oil on the islands is coming from. We also worked

with a crew from PISCO (Partnership for Interdisciplinary Studies of Coastal Oceans) at the Santa Cruz Island sites with larval recruitment studies and comprehensive surveys of Trailer, Fraser Cove, Willows Anchorage, and Prisoner's Harbor. The comprehensive surveys used point-intercept transects running vertically through the intertidal zone from a 60-m baseline transect. At most sites the lines overlapped the photoplot area. The comprehensive transects are designed to give a broader overview of a site and to map taxa distribution. This should allow us to follow the migration of taxa throughout the intertidal zone if performed regularly.

Following one of the largest El Niños on record in 1997-1998, the ocean conditions of 1999 were the coldest in a decade. Euphusids were observed washing ashore at Scorpion Anchorage and at Christy Beach on opposite ends of Santa Cruz Island as well as being generally observed in various offshore areas. Algal growth was generally good, but otherwise few changes were noted.

Although ocean temperatures were cold, we still see some of the warmer water fauna holding on at some throughout the islands. *Tegula gallina* is a herbivorous snail at the northern end of its range on the islands. Though much less common than *T. funebralis* we did find at least a few individuals at Cat Rock, Scorpion Rock, Willows Anchorage, Trailer, Prisoner's Harbor, Fossil Reef and Northwest Talcott. Mobile invertebrate counts will help us determine if the numbers of *T. gallina* increase in number or proportion to *T. funebralis* the future.

The red alga, *Porphyra perforata*, was abundant at many of the sites in 1999, particularly at Santa Cruz Island. The heavy growth obscured many of the target organisms in the photoplots and made searching for owl limpets difficult.

The discovery of several black abalone, *Haliotis cracherodii*, juveniles at Otter Harbor and Crook Point was a bright spot in the abalone story. However, the most abalone counted at any site was only 75 at Otter Harbor, which once had nearly ten times that quantity in a fraction of the area. We did not find any abalone at six sites. Though a few abalone are occasionally found in the plots, most of the abalone seem to be transitory at the low densities and are not often found in the same place on subsequent visits. It is obvious that the fixed plots do not function as adequate measures for monitoring at the

low population densities currently found on the islands. Though most of the black abalone observed appeared to be healthy, Withering Syndrome (Richards and Davis 1993) continues to affect abalone at the islands. Two slightly shrunken abalone were observed at Fossil Reef.

The seastar, *Pisaster ochraceus,* was present in high numbers at several sites and appeared to be affecting the abundance of mussels at Fossil Reef, Landing Cove, Johnson's Lee, and Willows Anchorage. High densities of *P. ochraceus* were observed at Crook Point and Ford Point with impacts less obvious or lower in the intertidal zone. Seastar numbers at Willows Anchorage appear to be increasing. These seastars are native animals and the range of densities we have observed is considered to be within the normal limits of variation. *Pisaster ochraceus* is usually considered to be a keystone species because of the influence it has on the community structure. This has certainly been the case at Johnson's Lee where the seastars create large clearings in the mussel beds allowing other organisms such as *Phragmatopoma californica* and *Anthopleura solis* to become dominant. At other sites, such as Landing Cove, the mussel recruitment appears to be faster and possibly more frequent. As a result small *Mytilus californianus* are often among the first recruits to an open patch, thus mussels are able to maintain a competitive advantage and dominate the reef.

No diseased seastars were observed in 1999. The health of the seastars may have been aided by the "La Niña" conditions. Purple sea urchins, *Strongylocentrotus purpuratus*, were observed with spin loss or "bald spots" on their tests at Otter Harbor. The symptoms are consistent with the urchin disease observed in intertidal and subtidal areas (Richards and Kushner 1994) though unusual in cold water.

Recommendations for Monitoring:

Expansion of the program to include owl limpet monitoring plots at all islands, mobile invertebrate counts, an expanded the list of target organisms in the photoplots, and consistent measures of seastar and abalone numbers will make the program stronger. Partnerships with other agencies and academia are needed for assistance with analysis, review of the program goals and techniques. This has played out in the review workshop and through participation in the Multi-Agency Rocky Intertidal Network (MARINE).

Channel Islands National Park has been an active participant in MARINE and should continue to work with the consortium to develop protocol standardization and efficient ways to share and analyze data towards an understanding of the rocky intertidal zone ecosystem. We need to understand the system to protect harvested species, respond to perturbations such as an oil spill, and to recover depleted species such as black abalone.

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Appendix A. Photoquadrat Data

Percent cover of selected taxa in fixed 50 x 75 cm photoquadrats based on 100 points per plot. The key species reported for each site was expanded in 1999 with the following modifications: *Tetraclita rubescens* and the acorn barnacles, *Balanus glandula* and *Chthamalus fissus/dalli* were previously combined in the Barnacle category; goose(leaf) barnacles, *Pollicipes polymerus,* are now separated from Miscellaneous Animals; *Silvetia (Pelvetia) compressa* and *Hesperophycus californicus* were previously combined as Rockweed. Red algal turf as a category has not changed and includes *Chondracanthus (Gigartina) canaliculatus, Gelidium* sp. and *Pterocladia capillacea*.

Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 1999 (4/12/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	31	31	41	0	6	18	0	0	0	2	2	0	0	100
	32	45	18	0	18	14	3	0	0	2	0	0	0	100
	33	14	9	0	7	52	1	0	0	16	1	0	0	100
	35	30	41	0	12	10	0	0	0	4	3	0	0	100
	36	29	13	0	3	41	3	0	0	11	0	0	0	100
	37	28	20	0	8	18	16	0	0	10	0	0	0	100
	38	37	43	0	3	1	0	0	0	16	0	0	0	100
	39	51	39	0	4	2	0	0	0	2	2	0	0	100
	135	16	9	0	4	53	8	0	0	10	0	0	0	100
	Mean	**31.22**	**25.89**	**.00**	**7.22**	**23.22**	**3.44**	**.00**	**.00**	**8.11**	**.89**	**.00**	**.00**	**100.00**
	StDev	**12.04**	**14.81**	**.00**	**4.97**	**20.28**	**5.39**	**.00**	**.00**	**5.80**	**1.17**	**.00**	**.00**	**.00**
Endocladia	13	20	12	6	35	0	0	2	0	21	3	1	0	100
	14	47	2	9	17	0	0	4	0	19	2	0	0	100
	19	12	0	0	38	5	10	0	0	33	2	0	0	100
	51	7	4	2	11	0	0	0	0	75	1	0	0	100
	52	7	7	0	35	0	0	3	0	46	2	0	0	100
	54	11	3	4	17	0	0	0	0	61	4	0	0	100
	212	11	4	5	46	0	0	0	0	31	3	0	0	100
	467	10	4	5	34	0	0	0	0	43	4	0	0	100
	492	24	3	5	33	1	7	1	0	23	3	0	0	100
	Mean	**16.56**	**4.33**	**4.00**	**29.56**	**.67**	**1.89**	**1.11**	**.00**	**39.11**	**2.67**	**.11**	**.00**	**100.00**
	StDev	**12.76**	**3.43**	**2.92**	**11.68**	**1.66**	**3.82**	**1.54**	**.00**	**19.12**	**1.00**	**.33**	**.00**	**.00**
Rockweed	2	20	11	0	17	4	29	0	0	18	1	0	0	100
	3	24	22	0	7	20	16	0	0	11	0	0	0	100
	4	19	6	0	7	7	47	0	0	14	0	0	0	100
	5	26	18	2	23	2	9	0	0	19	1	0	0	100
	6	10	1	0	9	12	58	0	0	9	0	1	0	100
	8	17	2	0	1	8	69	0	0	3	0	0	0	100
	9	2	2	0	13	9	68	0	0	6	0	0	0	100
	10	5	3	0	7	9	68	0	0	8	0	0	0	100
	55	26	21	6	7	0	0	3	0	34	3	0	0	100
	Mean	**16.56**	**9.56**	**.89**	**10.11**	**7.89**	**40.44**	**.33**	**.00**	**13.56**	**.56**	**.11**	**.00**	**100.00**
	StDev	**8.95**	**8.68**	**2.03**	**6.57**	**5.90**	**27.47**	**1.00**	**.00**	**9.32**	**1.01**	**.33**	**.00**	**.00**

Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 1999 (4/12/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	20	4	17	0	0	0	42	1	15	1	0	0	100
	164	17	9	18	0	0	0	26	0	28	2	0	0	100
	203	13	4	10	0	0	0	43	0	23	7	0	0	100
	204	17	2	4	0	0	0	35	1	35	6	0	0	100
	468	20	10	5	0	0	0	13	0	43	9	0	0	100
	470	39	1	14	0	0	0	21	0	23	2	0	0	100
	471	51	9	8	0	0	0	8	0	23	1	0	0	100
	472	13	1	14	0	0	0	50	0	21	1	0	0	100
	473	34	1	7	0	0	0	31	1	23	3	0	0	100
	Mean	**24.89**	**4.56**	**10.78**	**.00**	**.00**	**.00**	**29.89**	**.33**	**26.00**	**3.56**	**.00**	**.00**	**100.00**
	StDev	**13.32**	**3.78**	**5.17**	**.00**	**.00**	**.00**	**14.18**	**.50**	**8.34**	**3.00**	**.00**	**.00**	**.00**

Percent Cover of Index Species
S Frenchy's Cove, Anacapa Island - Spring 1999 (4/13/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	249	19	36	0	42	0	0	0	0	1	1	1	0	100
	250	48	34	0	15	0	0	0	0	2	0	1	0	100
	251	54	39	0	1	0	0	0	0	2	3	1	0	100
	252	46	22	0	3	0	0	0	0	27	2	0	0	100
	253	40	41	12	0	0	0	0	0	0	6	1	0	100
	Mean	**41.40**	**34.40**	**2.40**	**12.20**	**.00**	**.00**	**.00**	**.00**	**6.40**	**2.40**	**.80**	**.00**	**100.00**
	StDev	**13.48**	**7.44**	**5.37**	**17.71**	**.00**	**.00**	**.00**	**.00**	**11.55**	**2.30**	**.45**	**.00**	**.00**
Endocladia	154	26	6	0	28	0	0	0	0	39	1	0	0	100
	155	13	0	0	65	0	20	0	0	1	0	1	0	100
	256	30	0	0	40	10	3	0	0	15	1	1	0	100
	257	19	1	0	64	0	0	0	0	15	0	1	0	100
	258	23	0	0	27	0	47	0	0	3	0	0	0	100
	Mean	**22.20**	**1.40**	**.00**	**44.80**	**2.00**	**14.00**	**.00**	**.00**	**14.60**	**.40**	**.60**	**.00**	**100.00**
	StDev	**6.53**	**2.61**	**.00**	**18.70**	**4.47**	**20.24**	**.00**	**.00**	**15.13**	**.55**	**.55**	**.00**	**.00**
Rockweed	259	4	0	0	4	0	82	0	0	9	1	0	0	100
	260	24	3	0	4	1	23	0	0	45	0	0	0	100
	261	1	0	0	0	0	91	0	0	6	2	0	0	100
	262	22	9	0	0	0	4	0	0	63	2	0	0	100
	263	3	0	0	1	0	84	0	0	12	0	0	0	100
	Mean	**10.80**	**2.40**	**.00**	**1.80**	**.20**	**56.80**	**.00**	**.00**	**27.00**	**1.00**	**.00**	**.00**	**100.00**
	StDev	**11.21**	**3.91**	**.00**	**2.05**	**.45**	**40.23**	**.00**	**.00**	**25.54**	**1.00**	**.00**	**.00**	**.00**
Mussels	201	2	0	0	4	0	0	20	0	69	5	0	0	100
	202	2	0	2	0	0	0	49	0	37	10	0	0	100
	264	3	0	0	1	0	0	58	0	28	10	0	0	100
	265	8	0	1	0	0	0	63	0	19	9	0	0	100
	266	2	0	1	0	0	0	49	0	39	9	0	0	100
	Mean	**3.40**	**.00**	**.80**	**1.00**	**.00**	**.00**	**47.80**	**.00**	**38.40**	**8.60**	**.00**	**.00**	**100.00**
	StDev	**2.61**	**.00**	**.84**	**1.73**	**.00**	**.00**	**16.66**	**.00**	**18.86**	**2.07**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Crook Point, San Miguel Island - Spring 1999 (3/16/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	137	77	23	0	0	0	0	0	0	0	0	0	0	100
	147	60	30	0	0	0	0	0	0	8	2	0	0	100
	148	46	48	0	0	0	0	0	0	6	0	0	0	100
	149	75	18	0	4	0	0	0	0	1	2	0	0	100
	495	52	41	0	5	0	0	0	0	1	1	0	0	100
	Mean	**62.00**	**32.00**	**.00**	**1.80**	**.00**	**.00**	**.00**	**.00**	**3.20**	**1.00**	**.00**	**.00**	**100.00**
	StDev	**13.73**	**12.43**	**.00**	**2.49**	**.00**	**.00**	**.00**	**.00**	**3.56**	**1.00**	**.00**	**.00**	**.00**
Endocladia	386	61	1	0	33	0	1	0	0	4	0	0	0	100
	387	50	2	5	24	0	0	1	0	11	7	0	0	100
	388	73	1	0	15	0	0	0	0	3	8	0	0	100
	389	34	4	1	26	0	5	22	2	4	2	0	0	100
	390	43	7	0	14	0	1	10	4	21	0	0	0	100
	Mean	**52.20**	**3.00**	**1.20**	**22.40**	**.00**	**1.40**	**6.60**	**1.20**	**8.60**	**3.40**	**.00**	**.00**	**100.00**
	StDev	**15.25**	**2.55**	**2.17**	**7.96**	**.00**	**2.07**	**9.58**	**1.79**	**7.64**	**3.85**	**.00**	**.00**	**.00**
Rockweed	396	58	0	0	37	0	2	0	0	3	0	0	0	100
	397	22	66	0	0	0	2	0	0	10	0	0	0	100
	398	46	2	1	3	0	17	19	2	10	0	0	0	100
	399	58	2	0	1	0	3	28	0	5	3	0	0	100
	400	40	0	2	17	0	19	0	0	17	5	0	0	100
	Mean	**44.80**	**14.00**	**.60**	**11.60**	**.00**	**8.60**	**9.40**	**.40**	**9.00**	**1.60**	**.00**	**.00**	**100.00**
	StDev	**14.94**	**29.09**	**.89**	**15.77**	**.00**	**8.62**	**13.26**	**.89**	**5.43**	**2.30**	**.00**	**.00**	**.00**
Mussels	381	9	2	1	0	0	0	41	3	42	2	0	0	100
	382	4	0	0	0	0	0	95	0	1	0	0	0	100
	383	4	0	0	0	0	0	89	0	7	0	0	0	100
	384	6	1	2	0	0	0	76	6	7	2	0	0	100
	385	16	1	0	0	0	0	68	8	4	3	0	0	100
	Mean	**7.80**	**.80**	**.60**	**.00**	**.00**	**.00**	**73.80**	**3.40**	**12.20**	**1.40**	**.00**	**.00**	**100.00**
	StDev	**5.02**	**.84**	**.89**	**.00**	**.00**	**.00**	**21.18**	**3.58**	**16.84**	**1.34**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Cuyler Harbor, San Miguel Island - Spring 1999 (3/18/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	416	69	30	0	0	0	0	0	0	0	1	0	0	100
	417	54	0	0	0	0	0	46	0	0	0	0	0	100
	418	54	45	0	0	0	0	0	0	0	1	0	0	100
	419	74	21	0	1	0	0	0	0	1	2	1	0	100
	420	69	17	0	12	0	0	0	0	1	1	0	0	100
	Mean	**64.00**	**22.60**	**.00**	**2.60**	**.00**	**.00**	**9.20**	**.00**	**.40**	**1.00**	**.20**	**.00**	**100.00**
	StDev	**9.35**	**16.59**	**.00**	**5.27**	**.00**	**.00**	**20.57**	**.00**	**.55**	**.71**	**.45**	**.00**	**.00**
Endocladia	411	57	2	0	29	0	0	6	0	4	2	0	0	100
	412	37	32	0	19	0	0	8	0	4	0	0	0	100
	413	38	0	0	26	0	31	0	0	5	0	0	0	100
	414	21	0	0	77	0	0	0	0	2	0	0	0	100
	415	51	0	0	44	0	0	0	0	5	0	0	0	100
	Mean	**40.80**	**6.80**	**.00**	**39.00**	**.00**	**6.20**	**2.80**	**.00**	**4.00**	**.40**	**.00**	**.00**	**100.00**
	StDev	**13.97**	**14.11**	**.00**	**23.12**	**.00**	**13.86**	**3.90**	**.00**	**1.22**	**.89**	**.00**	**.00**	**.00**
Rockweed	406	25	0	0	2	0	53	0	0	14	6	0	0	100
	407	8	0	0	0	0	90	0	0	2	0	0	0	100
	408	9	0	0	0	0	84	0	0	6	1	0	0	100
	409	5	0	0	0	0	91	0	0	4	0	0	0	100
	410	8	0	0	0	0	89	0	0	3	0	0	0	100
	Mean	**11.00**	**.00**	**.00**	**.40**	**.00**	**81.40**	**.00**	**.00**	**5.80**	**1.40**	**.00**	**.00**	**100.00**
	StDev	**7.97**	**.00**	**.00**	**.89**	**.00**	**16.10**	**.00**	**.00**	**4.82**	**2.61**	**.00**	**.00**	**.00**
Mussels	401	51	0	10	0	0	0	20	1	4	14	0	0	100
	402	2	0	2	0	0	0	75	0	2	19	0	0	100
	403	12	0	1	1	0	0	73	1	3	9	0	0	100
	404	28	0	15	0	0	0	26	4	8	19	0	0	100
	405	51	0	14	2	0	0	18	1	8	6	0	0	100
	Mean	**28.80**	**.00**	**8.40**	**.60**	**.00**	**.00**	**42.40**	**1.40**	**5.00**	**13.40**	**.00**	**.00**	**100.00**
	StDev	**22.29**	**.00**	**6.58**	**.89**	**.00**	**.00**	**29.01**	**1.52**	**2.83**	**5.86**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Otter Harbor, San Miguel Island - Spring 1999 (3/17/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	370	24	6	0	0	0	0	0	0	69	0	1	0	100
	371	4	15	0	0	0	0	0	0	75	0	6	0	100
	372	66	30	0	0	0	0	0	0	3	1	0	0	100
	373	14	36	0	0	0	0	0	0	43	0	7	0	100
	374	0	0	0	0	0	0	0	0	100	0	0	0	100
	Mean	**21.60**	**17.40**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**58.00**	**.20**	**2.80**	**.00**	**100.00**
	StDev	**26.51**	**15.36**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**36.82**	**.45**	**3.42**	**.00**	**.00**
Endocladia	360	11	1	2	43	0	16	1	1	24	1	0	0	100
	361	12	0	0	51	0	25	0	0	11	1	0	0	100
	362	6	0	0	72	0	0	2	0	19	1	0	0	100
	363	3	0	0	37	0	41	0	1	17	1	0	0	100
	364	3	0	0	63	0	17	1	0	14	2	0	0	100
	Mean	**7.00**	**.20**	**.40**	**53.20**	**.00**	**19.80**	**.80**	**.40**	**17.00**	**1.20**	**.00**	**.00**	**100.00**
	StDev	**4.30**	**.45**	**.89**	**14.32**	**.00**	**14.92**	**.84**	**.55**	**4.95**	**.45**	**.00**	**.00**	**.00**
Rockweed	355	22	0	0	41	3	26	0	0	7	1	0	0	100
	356	3	0	0	13	3	65	0	0	16	0	0	0	100
	357	10	0	1	32	0	42	0	0	14	1	0	0	100
	358	22	1	0	19	14	13	0	0	31	0	0	0	100
	359	20	43	0	18	2	0	0	0	13	3	1	0	100
	Mean	**15.40**	**8.80**	**.20**	**24.60**	**4.40**	**29.20**	**.00**	**.00**	**16.20**	**1.00**	**.20**	**.00**	**100.00**
	StDev	**8.53**	**19.12**	**.45**	**11.55**	**5.50**	**25.35**	**.00**	**.00**	**8.93**	**1.22**	**.45**	**.00**	**.00**
Mussels	375	5	0	1	0	0	0	65	8	20	1	0	0	100
	376	9	0	2	0	0	0	53	1	35	0	0	0	100
	378	0	0	0	0	0	0	59	14	27	0	0	0	100
	379	4	0	0	0	0	0	70	9	16	1	0	0	100
	380	1	0	0	0	0	0	91	0	8	0	0	0	100
	Mean	**3.80**	**.00**	**.60**	**.00**	**.00**	**.00**	**67.60**	**6.40**	**21.20**	**.40**	**.00**	**.00**	**100.00**
	StDev	**3.56**	**.00**	**.89**	**.00**	**.00**	**.00**	**14.55**	**5.86**	**10.33**	**.55**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 1999 (5/19/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	876	12	5	0	38	0	0	0	1	43	1	0	0	100
	877	23	3	0	17	0	0	0	0	57	0	0	0	100
	878	10	5	0	0	0	0	0	0	85	0	0	0	100
	879	18	11	0	9	0	0	0	0	62	0	0	0	100
	880	11	10	0	30	0	0	0	0	49	0	0	0	100
	Mean	**14.80**	**6.80**	**.00**	**18.80**	**.00**	**.00**	**.00**	**.20**	**59.20**	**.20**	**.00**	**.00**	**100.00**
	StDev	**5.54**	**3.49**	**.00**	**15.39**	**.00**	**.00**	**.00**	**.45**	**16.16**	**.45**	**.00**	**.00**	**.00**
Endocladia	881	45	1	0	38	0	0	0	0	14	2	0	0	100
	882	12	2	0	81	0	0	0	0	5	0	0	0	100
	883	6	0	0	60	2	0	0	0	30	2	0	0	100
	884	8	0	0	92	0	0	0	0	0	0	0	0	100
	885	17	0	0	81	0	0	0	0	2	0	0	0	100
	Mean	**17.60**	**.60**	**.00**	**70.40**	**.40**	**.00**	**.00**	**.00**	**10.20**	**.80**	**.00**	**.00**	**100.00**
	StDev	**15.88**	**.89**	**.00**	**21.50**	**.89**	**.00**	**.00**	**.00**	**12.30**	**1.10**	**.00**	**.00**	**.00**
Rockweed	896	17	0	0	12	0	68	0	0	2	1	0	0	100
	897	8	1	0	5	6	52	0	0	27	1	0	0	100
	898	14	0	0	0	0	79	0	0	4	3	0	0	100
	899	30	2	0	3	12	50	0	0	2	1	0	0	100
	900	14	2	0	3	6	75	0	0	0	0	0	0	100
	Mean	**16.60**	**1.00**	**.00**	**4.60**	**4.80**	**64.80**	**.00**	**.00**	**7.00**	**1.20**	**.00**	**.00**	**100.00**
	StDev	**8.17**	**1.00**	**.00**	**4.51**	**5.02**	**13.22**	**.00**	**.00**	**11.27**	**1.10**	**.00**	**.00**	**.00**
Mussels	891	9	0	0	0	0	0	43	0	12	36	0	0	100
	892	33	1	0	0	0	0	42	0	12	12	0	0	100
	893	10	0	0	0	0	0	67	1	6	16	0	0	100
	894	1	0	0	0	0	0	88	2	4	5	0	0	100
	895	10	0	0	0	0	0	70	9	4	7	0	0	100
	Mean	**12.60**	**.20**	**.00**	**.00**	**.00**	**.00**	**62.00**	**2.40**	**7.60**	**15.20**	**.00**	**.00**	**100.00**
	StDev	**12.01**	**.45**	**.00**	**.00**	**.00**	**.00**	**19.53**	**3.78**	**4.10**	**12.40**	**.00**	**.00**	**.00**
Pollicipes	901	24	7	0	0	0	0	38	9	17	5	0	0	100
	902	49	3	0	2	0	0	10	6	28	2	0	0	100
	903	0	1	0	0	0	0	51	22	10	16	0	0	100
	904	7	2	0	0	0	0	49	19	7	16	0	0	100
	905	2	0	0	1	0	0	54	29	3	11	0	0	100
	Mean	**16.40**	**2.60**	**.00**	**.60**	**.00**	**.00**	**40.40**	**17.00**	**13.00**	**10.00**	**.00**	**.00**	**100.00**
	StDev	**20.53**	**2.70**	**.00**	**.89**	**.00**	**.00**	**18.04**	**9.46**	**9.82**	**6.36**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 1999 (5/19/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Tar	906	15	6	0	0	0	0	0	0	22	0	57	0	100
	907	15	12	0	0	0	0	0	0	49	0	24	0	100
	908	15	14	0	0	0	0	0	0	28	0	43	0	100
	909	14	4	0	0	0	0	0	0	58	0	24	0	100
	910	3	2	0	0	0	0	0	0	45	0	50	0	100
	Mean	**12.40**	**7.60**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**40.40**	**.00**	**39.60**	**.00**	**100.00**
	StDev	**5.27**	**5.18**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**14.98**	**.00**	**15.08**	**.00**	**.00**
Hesperophycus	886	49	2	0	7	3	0	0	0	39	0	0	0	100
	887	68	2	0	7	1	0	0	0	21	1	0	0	100
	888	46	20	0	19	14	0	0	1	0	0	0	0	100
	889	67	6	0	7	1	1	0	0	18	0	0	0	100
	890	35	7	0	18	19	14	0	0	7	0	0	0	100
	Mean	**53.00**	**7.40**	**.00**	**11.60**	**7.60**	**3.00**	**.00**	**.20**	**17.00**	**.20**	**.00**	**.00**	**100.00**
	StDev	**14.23**	**7.40**	**.00**	**6.31**	**8.35**	**6.16**	**.00**	**.45**	**14.92**	**.45**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Orizaba Cove, Santa Cruz Island - Spring 1999 (4/24/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	851	71	18	5	0	0	0	1	0	1	4	0	0	100
	852	39	54	2	0	0	0	1	0	0	4	0	0	100
	853	52	44	1	2	0	0	1	0	0	0	0	0	100
	854	56	30	8	0	0	0	1	0	5	0	0	0	100
	855	29	56	1	4	0	0	0	0	10	0	0	0	100
	Mean	**49.40**	**40.40**	**3.40**	**1.20**	**.00**	**.00**	**.80**	**.00**	**3.20**	**1.60**	**.00**	**.00**	**100.00**
	StDev	**16.13**	**16.21**	**3.05**	**1.79**	**.00**	**.00**	**.45**	**.00**	**4.32**	**2.19**	**.00**	**.00**	**.00**
Rockweed	866	12	0	0	0	0	47	0	0	41	0	0	0	100
	867	18	0	0	0	0	38	0	0	43	1	0	0	100
	868	13	0	0	0	0	44	1	0	42	0	0	0	100
	869	16	0	2	0	0	59	0	0	22	1	0	0	100
	870	14	0	0	1	2	55	0	0	28	0	0	0	100
	Mean	**14.60**	**.00**	**.40**	**.20**	**.40**	**48.60**	**.20**	**.00**	**35.20**	**.40**	**.00**	**.00**	**100.00**
	StDev	**2.41**	**.00**	**.89**	**.45**	**.89**	**8.44**	**.45**	**.00**	**9.58**	**.55**	**.00**	**.00**	**.00**
Mussels	861	20	0	16	0	0	0	47	1	14	2	0	0	100
	862	3	0	10	0	0	0	84	1	1	1	0	0	100
	863	8	0	0	0	0	0	80	3	9	0	0	0	100
	864	4	0	1	0	0	0	86	3	5	1	0	0	100
	865	0	0	1	0	0	0	97	2	0	0	0	0	100
	Mean	**7.00**	**.00**	**5.60**	**.00**	**.00**	**.00**	**78.80**	**2.00**	**5.80**	**.80**	**.00**	**.00**	**100.00**
	StDev	**7.81**	**.00**	**7.09**	**.00**	**.00**	**.00**	**18.86**	**1.00**	**5.81**	**.84**	**.00**	**.00**	**.00**
Tetraclita	871	34	1	38	0	0	0	4	0	21	2	0	0	100
	872	41	0	32	0	0	0	8	2	14	3	0	0	100
	873	57	0	32	0	0	2	2	0	5	2	0	0	100
	874	46	0	29	0	0	0	6	2	14	3	0	0	100
	875	50	0	27	0	0	0	4	0	17	2	0	0	100
	Mean	**45.60**	**.20**	**31.60**	**.00**	**.00**	**.40**	**4.80**	**.80**	**14.20**	**2.40**	**.00**	**.00**	**100.00**
	StDev	**8.73**	**.45**	**4.16**	**.00**	**.00**	**.89**	**2.28**	**1.10**	**5.89**	**.55**	**.00**	**.00**	**.00**
Hesperophycus	856	24	9	0	39	3	0	0	0	22	3	0	0	100
	857	39	0	2	2	2	16	1	0	36	2	0	0	100
	858	21	2	1	0	9	18	0	0	48	1	0	0	100
	859	57	14	1	11	2	2	1	0	11	1	0	0	100
	860	63	17	0	14	0	0	0	0	6	0	0	0	100
	Mean	**40.80**	**8.40**	**.80**	**13.20**	**3.20**	**7.20**	**.40**	**.00**	**24.60**	**1.40**	**.00**	**.00**	**100.00**
	StDev	**18.93**	**7.37**	**.84**	**15.58**	**3.42**	**9.01**	**.55**	**.00**	**17.43**	**1.14**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Spring 1999 (5/21/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	826	100	0	0	0	0	0	0	0	0	0	0	0	100
	827	38	0	0	1	0	32	2	0	27	0	0	0	100
	828	27	15	0	39	0	15	0	0	2	2	0	0	100
	829	30	33	3	21	0	3	0	0	2	8	0	0	100
	830	44	19	0	26	0	10	0	0	0	1	0	0	100
	Mean	**47.80**	**13.40**	**.60**	**17.40**	**.00**	**12.00**	**.40**	**.00**	**6.20**	**2.20**	**.00**	**.00**	**100.00**
	StDev	**29.94**	**13.94**	**1.34**	**16.77**	**.00**	**12.63**	**.89**	**.00**	**11.67**	**3.35**	**.00**	**.00**	**.00**
Endocladia	831	21	3	0	65	0	0	0	0	11	0	0	0	100
	832	15	13	0	63	2	0	1	0	6	0	0	0	100
	833	23	29	0	47	0	0	0	0	0	1	0	0	100
	834	21	19	0	56	1	0	1	0	1	1	0	0	100
	835	20	13	0	64	1	0	0	0	2	0	0	0	100
	Mean	**20.00**	**15.40**	**.00**	**59.00**	**.80**	**.00**	**.40**	**.00**	**4.00**	**.40**	**.00**	**.00**	**100.00**
	StDev	**3.00**	**9.53**	**.00**	**7.58**	**.84**	**.00**	**.55**	**.00**	**4.53**	**.55**	**.00**	**.00**	**.00**
Rockweed	846	1	0	0	0	0	96	0	0	3	0	0	0	100
	847	6	0	0	0	0	85	0	0	8	1	0	0	100
	848	0	0	0	0	0	95	0	0	5	0	0	0	100
	849	0	0	1	0	0	92	0	0	6	1	0	0	100
	850	0	0	0	0	0	92	0	0	8	0	0	0	100
	Mean	**1.40**	**.00**	**.20**	**.00**	**.00**	**92.00**	**.00**	**.00**	**6.00**	**.40**	**.00**	**.00**	**100.00**
	StDev	**2.61**	**.00**	**.45**	**.00**	**.00**	**4.30**	**.00**	**.00**	**2.12**	**.55**	**.00**	**.00**	**.00**
Mussels	841	10	0	0	0	0	0	12	0	58	20	0	0	100
	842	0	0	0	0	0	0	82	0	16	2	0	0	100
	843	4	3	1	0	0	0	77	0	6	9	0	0	100
	844	6	0	0	0	0	0	64	0	20	10	0	0	100
	845	17	2	2	0	0	0	61	1	9	8	0	0	100
	Mean	**7.40**	**1.00**	**.60**	**.00**	**.00**	**.00**	**59.20**	**.20**	**21.80**	**9.80**	**.00**	**.00**	**100.00**
	StDev	**6.47**	**1.41**	**.89**	**.00**	**.00**	**.00**	**27.80**	**.45**	**20.98**	**6.50**	**.00**	**.00**	**.00**
Hesperophycus	836	22	19	0	52	2	1	0	0	2	2	0	0	100
	837	40	20	0	22	13	0	0	0	2	3	0	0	100
	838	45	10	0	20	21	0	0	0	2	2	0	0	100
	839	38	46	0	11	1	2	0	0	0	2	0	0	100
	840	45	26	0	24	2	0	0	0	1	2	0	0	100
	Mean	**38.00**	**24.20**	**.00**	**25.80**	**7.80**	**.60**	**.00**	**.00**	**1.40**	**2.20**	**.00**	**.00**	**100.00**
	StDev	**9.46**	**13.46**	**.00**	**15.47**	**8.87**	**.89**	**.00**	**.00**	**.89**	**.45**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Scorpion Rock, Santa Cruz Island - Spring 1999 (6/1/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	801	50	42	0	7	0	0	0	0	1	0	0	0	100
	802	71	21	0	7	0	0	0	0	0	0	1	0	100
	803	67	30	0	2	0	0	0	0	0	1	0	0	100
	804	71	26	0	2	0	0	0	0	0	1	0	0	100
	805	63	37	0	0	0	0	0	0	0	0	0	0	100
	Mean	**64.40**	**31.20**	**.00**	**3.60**	**.00**	**.00**	**.00**	**.00**	**.20**	**.40**	**.20**	**.00**	**100.00**
	StDev	**8.71**	**8.41**	**.00**	**3.21**	**.00**	**.00**	**.00**	**.00**	**.45**	**.55**	**.45**	**.00**	**.00**
Endocladia	806	53	8	2	14	0	0	0	0	9	0	14	0	100
	807	54	4	4	9	0	0	0	1	19	0	9	0	100
	808	51	4	6	10	0	0	5	0	17	1	6	0	100
	809	50	31	0	12	0	0	0	0	5	0	2	0	100
	810	69	5	0	5	0	0	0	0	14	0	7	0	100
	Mean	**55.40**	**10.40**	**2.40**	**10.00**	**.00**	**.00**	**1.00**	**.20**	**12.80**	**.20**	**7.60**	**.00**	**100.00**
	StDev	**7.77**	**11.63**	**2.61**	**3.39**	**.00**	**.00**	**2.24**	**.45**	**5.76**	**.45**	**4.39**	**.00**	**.00**
Mussels	816	0	0	0	0	0	0	99	0	1	0	0	0	100
	817	17	0	2	0	0	0	75	0	3	3	0	0	100
	818	14	3	12	0	0	0	59	2	6	4	0	0	100
	819	14	0	2	0	0	0	81	0	3	0	0	0	100
	820	4	2	10	0	0	0	57	0	2	25	0	0	100
	Mean	**9.80**	**1.00**	**5.20**	**.00**	**.00**	**.00**	**74.20**	**.40**	**3.00**	**6.40**	**.00**	**.00**	**100.00**
	StDev	**7.36**	**1.41**	**5.40**	**.00**	**.00**	**.00**	**17.24**	**.89**	**1.87**	**10.55**	**.00**	**.00**	**.00**
Tetraclita	821	48	6	23	0	0	0	11	3	9	0	0	0	100
	822	51	2	9	0	0	0	30	2	6	0	0	0	100
	823	41	0	12	0	0	0	37	3	4	3	0	0	100
	824	44	1	23	0	0	0	22	0	6	4	0	0	100
	825	38	2	14	0	0	0	39	1	6	0	0	0	100
	Mean	**44.40**	**2.20**	**16.20**	**.00**	**.00**	**.00**	**27.80**	**1.80**	**6.20**	**1.40**	**.00**	**.00**	**100.00**
	StDev	**5.22**	**2.28**	**6.46**	**.00**	**.00**	**.00**	**11.52**	**1.30**	**1.79**	**1.95**	**.00**	**.00**	**.00**
Hesperophycus	811	12	1	0	20	66	0	0	0	0	0	1	0	100
	812	5	1	0	32	47	2	0	0	12	0	1	0	100
	813	16	0	0	22	37	24	0	0	0	0	1	0	100
	814	15	0	0	6	55	11	0	0	13	0	0	0	100
	815	27	1	0	22	43	0	0	0	7	0	0	0	100
	Mean	**15.00**	**.60**	**.00**	**20.40**	**49.60**	**7.40**	**.00**	**.00**	**6.40**	**.00**	**.60**	**.00**	**100.00**
	StDev	**7.97**	**.55**	**.00**	**9.32**	**11.26**	**10.33**	**.00**	**.00**	**6.27**	**.00**	**.55**	**.00**	**.00**

Percent Cover of Index Species
Trailer, Santa Cruz Island - Spring 1999 (5/18/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	911	36	28	0	31	0	0	1	0	4	0	0	0	100
	912	60	37	0	0	0	0	0	0	0	3	0	0	100
	913	45	44	0	8	0	0	0	0	3	0	0	0	100
	914	55	44	0	0	0	0	0	0	0	1	0	0	100
	915	63	33	0	0	0	0	0	0	0	4	0	0	100
	Mean	**51.80**	**37.20**	**.00**	**7.80**	**.00**	**.00**	**.20**	**.00**	**1.40**	**1.60**	**.00**	**.00**	**100.00**
	StDev	**11.17**	**6.98**	**.00**	**13.42**	**.00**	**.00**	**.45**	**.00**	**1.95**	**1.82**	**.00**	**.00**	**.00**
Rockweed	926	5	0	0	1	0	92	0	0	2	0	0	0	100
	927	11	1	0	0	0	86	0	0	2	0	0	0	100
	928	16	2	0	7	0	69	0	0	6	0	0	0	100
	929	14	0	0	0	0	79	0	0	7	0	0	0	100
	930	7	1	0	3	0	89	0	0	0	0	0	0	100
	Mean	**10.60**	**.80**	**.00**	**2.20**	**.00**	**83.00**	**.00**	**.00**	**3.40**	**.00**	**.00**	**.00**	**100.00**
	StDev	**4.62**	**.84**	**.00**	**2.95**	**.00**	**9.19**	**.00**	**.00**	**2.97**	**.00**	**.00**	**.00**	**.00**
Mussels	921	8	1	0	0	0	0	74	0	13	4	0	0	100
	922	3	0	0	0	0	0	42	1	37	17	0	0	100
	923	17	2	0	1	0	0	41	0	26	13	0	0	100
	924	23	3	0	0	0	0	34	0	23	17	0	0	100
	925	34	4	0	2	0	0	37	0	8	15	0	0	100
	Mean	**17.00**	**2.00**	**.00**	**.60**	**.00**	**.00**	**45.60**	**.20**	**21.40**	**13.20**	**.00**	**.00**	**100.00**
	StDev	**12.27**	**1.58**	**.00**	**.89**	**.00**	**.00**	**16.20**	**.45**	**11.37**	**5.40**	**.00**	**.00**	**.00**
Hesperophycus	916	58	3	0	10	14	12	0	0	2	1	0	0	100
	917	56	1	0	0	6	35	0	0	2	0	0	0	100
	918	52	1	0	10	24	12	0	0	1	0	0	0	100
	919	59	3	0	8	11	19	0	0	0	0	0	0	100
	920	41	7	0	20	13	0	0	0	18	1	0	0	100
	Mean	**53.20**	**3.00**	**.00**	**9.60**	**13.60**	**15.60**	**.00**	**.00**	**4.60**	**.40**	**.00**	**.00**	**100.00**
	StDev	**7.33**	**2.45**	**.00**	**7.13**	**6.58**	**12.82**	**.00**	**.00**	**7.54**	**.55**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Spring 1999 (5/20/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Endocladia	931	71	2	0	23	0	0	0	0	0	4	0	0	100
	932	70	3	0	24	0	0	0	0	0	3	0	0	100
	933	73	3	0	19	0	0	0	0	0	5	0	0	100
	934	72	3	1	18	0	0	0	0	0	6	0	0	100
	935	75	1	4	17	0	0	0	0	1	2	0	0	100
	Mean	**72.20**	**2.40**	**1.00**	**20.20**	**.00**	**.00**	**.00**	**.00**	**.20**	**4.00**	**.00**	**.00**	**100.00**
	StDev	**1.92**	**.89**	**1.73**	**3.11**	**.00**	**.00**	**.00**	**.00**	**.45**	**1.58**	**.00**	**.00**	**.00**
Rockweed	946	52	4	0	34	0	0	0	0	6	4	0	0	100
	947	78	3	1	7	0	0	0	0	6	5	0	0	100
	948	13	0	0	0	0	77	0	0	6	4	0	0	100
	949	3	0	0	0	0	91	0	0	5	1	0	0	100
	950	16	0	0	1	1	57	0	0	15	10	0	0	100
	Mean	**32.40**	**1.40**	**.20**	**8.40**	**.20**	**45.00**	**.00**	**.00**	**7.60**	**4.80**	**.00**	**.00**	**100.00**
	StDev	**31.52**	**1.95**	**.45**	**14.60**	**.45**	**42.82**	**.00**	**.00**	**4.16**	**3.27**	**.00**	**.00**	**.00**
Mussels	941	26	1	10	0	0	0	32	5	21	5	0	0	100
	942	11	0	2	0	0	0	42	4	38	3	0	0	100
	943	12	1	1	0	0	0	34	15	27	10	0	0	100
	944	20	1	4	4	0	0	19	19	28	5	0	0	100
	945	7	3	5	1	0	0	42	0	31	11	0	0	100
	Mean	**15.20**	**1.20**	**4.40**	**1.00**	**.00**	**.00**	**33.80**	**8.60**	**29.00**	**6.80**	**.00**	**.00**	**100.00**
	StDev	**7.66**	**1.10**	**3.51**	**1.73**	**.00**	**.00**	**9.44**	**8.02**	**6.20**	**3.49**	**.00**	**.00**	**.00**
Hesperophycus	936	91	6	0	0	0	0	0	0	2	1	0	0	100
	937	38	7	0	11	14	11	0	0	19	0	0	0	100
	938	78	6	0	2	0	3	0	0	10	1	0	0	100
	939	23	0	0	1	3	68	0	0	4	1	0	0	100
	940	35	5	0	10	16	21	0	0	11	2	0	0	100
	Mean	**53.00**	**4.80**	**.00**	**4.80**	**6.60**	**20.60**	**.00**	**.00**	**9.20**	**1.00**	**.00**	**.00**	**100.00**
	StDev	**29.66**	**2.77**	**.00**	**5.26**	**7.80**	**27.72**	**.00**	**.00**	**6.69**	**.71**	**.00**	**.00**	**.00**

Percent Cover of Index Species
East Point, Santa Rosa Island - Spring 1999 (4/18/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	575	65	33	0	0	0	0	0	0	0	2	0	0	100
	576	43	22	0	24	9	0	0	0	2	0	0	0	100
	577	45	26	0	27	0	2	0	0	0	0	0	0	100
	578	76	23	0	0	0	0	0	0	0	0	1	0	100
	579	64	31	0	5	0	0	0	0	0	0	0	0	100
	Mean	**58.60**	**27.00**	**.00**	**11.20**	**1.80**	**.40**	**.00**	**.00**	**.40**	**.40**	**.20**	**.00**	**100.00**
	StDev	**14.15**	**4.85**	**.00**	**13.26**	**4.02**	**.89**	**.00**	**.00**	**.89**	**.89**	**.45**	**.00**	**.00**
Endocladia	580	13	2	0	72	9	4	0	0	0	0	0	0	100
	581	24	3	0	57	16	0	0	0	0	0	0	0	100
	582	16	2	0	62	4	16	0	0	0	0	0	0	100
	583	15	3	0	75	4	3	0	0	0	0	0	0	100
	584	10	6	0	61	23	0	0	0	0	0	0	0	100
	Mean	**15.60**	**3.20**	**.00**	**65.40**	**11.20**	**4.60**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**100.00**
	StDev	**5.22**	**1.64**	**.00**	**7.70**	**8.23**	**6.62**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**
Rockweed	585	9	0	0	1	0	76	0	0	14	0	0	0	100
	586	9	0	0	0	0	82	0	0	9	0	0	0	100
	587	0	0	0	0	0	99	0	0	1	0	0	0	100
	588	1	0	0	0	0	96	0	0	3	0	0	0	100
	589	9	0	0	1	0	82	0	0	8	0	0	0	100
	Mean	**5.60**	**.00**	**.00**	**.40**	**.00**	**87.00**	**.00**	**.00**	**7.00**	**.00**	**.00**	**.00**	**100.00**
	StDev	**4.67**	**.00**	**.00**	**.55**	**.00**	**9.95**	**.00**	**.00**	**5.15**	**.00**	**.00**	**.00**	**.00**
Mussels	590	10	0	0	0	0	0	82	1	7	0	0	0	100
	591	7	7	0	0	0	0	49	0	20	17	0	0	100
	592	4	1	0	0	0	0	81	0	12	2	0	0	100
	593	3	0	0	0	0	0	95	0	2	0	0	0	100
	594	6	0	0	0	0	0	82	0	12	0	0	0	100
	Mean	**6.00**	**1.60**	**.00**	**.00**	**.00**	**.00**	**77.80**	**.20**	**10.60**	**3.80**	**.00**	**.00**	**100.00**
	StDev	**2.74**	**3.05**	**.00**	**.00**	**.00**	**.00**	**17.11**	**.45**	**6.69**	**7.43**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Ford Point, Santa Rosa Island - Spring 1999 (4/14/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	520	75	9	0	0	0	0	0	0	7	9	0	0	100
	521	71	24	0	1	0	0	0	0	1	3	0	0	100
	522	74	21	0	0	0	0	0	0	0	5	0	0	100
	523	52	28	0	18	0	0	0	0	0	2	0	0	100
	524	65	33	0	0	0	0	0	0	0	2	0	0	100
	Mean	**67.40**	**23.00**	**.00**	**3.80**	**.00**	**.00**	**.00**	**.00**	**1.60**	**4.20**	**.00**	**.00**	**100.00**
	StDev	**9.45**	**9.03**	**.00**	**7.95**	**.00**	**.00**	**.00**	**.00**	**3.05**	**2.95**	**.00**	**.00**	**.00**
Endocladia	525	46	1	0	39	0	0	5	0	6	3	0	0	100
	526	49	4	0	30	0	0	8	0	8	1	0	0	100
	527	28	0	0	52	0	0	4	0	16	0	0	0	100
	528	45	0	1	36	0	0	3	0	14	1	0	0	100
	529	33	0	0	56	0	0	2	0	7	2	0	0	100
	Mean	**40.20**	**1.00**	**.20**	**42.60**	**.00**	**.00**	**4.40**	**.00**	**10.20**	**1.40**	**.00**	**.00**	**100.00**
	StDev	**9.15**	**1.73**	**.45**	**10.99**	**.00**	**.00**	**2.30**	**.00**	**4.49**	**1.14**	**.00**	**.00**	**.00**
Mussels	530	40	3	0	1	0	0	11	0	42	3	0	0	100
	531	4	0	0	0	0	0	94	0	0	2	0	0	100
	532	5	0	0	0	0	0	95	0	0	0	0	0	100
	533	36	0	0	1	0	0	43	0	18	2	0	0	100
	534	44	0	0	0	0	0	5	1	48	2	0	0	100
	Mean	**25.80**	**.60**	**.00**	**.40**	**.00**	**.00**	**49.60**	**.20**	**21.60**	**1.80**	**.00**	**.00**	**100.00**
	StDev	**19.65**	**1.34**	**.00**	**.55**	**.00**	**.00**	**43.46**	**.45**	**22.69**	**1.10**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Spring 1999 (4/15/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	605	55	43	0	0	0	0	0	0	0	2	0	0	100
	606	57	37	0	0	0	0	0	0	0	1	5	0	100
	607	49	46	0	0	0	0	0	0	0	4	1	0	100
	608	71	26	0	0	0	0	0	0	2	0	1	0	100
	609	66	31	0	0	0	0	0	0	1	0	2	0	100
	Mean	**59.60**	**36.60**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.60**	**1.40**	**1.80**	**.00**	**100.00**
	StDev	**8.82**	**8.26**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.89**	**1.67**	**1.92**	**.00**	**.00**
Endocladia	610	53	40	0	3	0	0	1	0	1	1	1	0	100
	611	48	39	0	0	0	9	0	0	0	4	0	0	100
	612	6	0	0	0	0	88	0	0	3	3	0	0	100
	613	56	13	0	27	0	0	0	0	3	1	0	0	100
	614	10	0	0	1	0	83	0	0	5	1	0	0	100
	Mean	**34.60**	**18.40**	**.00**	**6.20**	**.00**	**36.00**	**.20**	**.00**	**2.40**	**2.00**	**.20**	**.00**	**100.00**
	StDev	**24.49**	**19.98**	**.00**	**11.69**	**.00**	**45.37**	**.45**	**.00**	**1.95**	**1.41**	**.45**	**.00**	**.00**
Rockweed	615	51	2	0	0	0	44	0	0	2	1	0	0	100
	616	70	13	0	0	0	1	0	0	13	3	0	0	100
	617	48	0	0	0	0	44	0	0	8	0	0	0	100
	618	73	9	0	11	0	2	0	0	3	2	0	0	100
	619	77	5	0	3	0	8	0	0	3	4	0	0	100
	Mean	**63.80**	**5.80**	**.00**	**2.80**	**.00**	**19.80**	**.00**	**.00**	**5.80**	**2.00**	**.00**	**.00**	**100.00**
	StDev	**13.33**	**5.26**	**.00**	**4.76**	**.00**	**22.25**	**.00**	**.00**	**4.66**	**1.58**	**.00**	**.00**	**.00**
Mussels	620	5	0	3	2	0	0	11	0	41	38	0	0	100
	621	8	0	5	2	0	0	9	0	48	28	0	0	100
	622	17	0	16	2	0	0	14	1	43	7	0	0	100
	623	22	0	9	0	0	0	16	3	36	14	0	0	100
	624	2	0	0	0	0	0	16	0	33	49	0	0	100
	Mean	**10.80**	**.00**	**6.60**	**1.20**	**.00**	**.00**	**13.20**	**.80**	**40.20**	**27.20**	**.00**	**.00**	**100.00**
	StDev	**8.41**	**.00**	**6.19**	**1.10**	**.00**	**.00**	**3.11**	**1.30**	**5.89**	**17.14**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Spring 1999 (4/19/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	500	57	42	0	1	0	0	0	0	0	0	0	0	100
	501	65	35	0	0	0	0	0	0	0	0	0	0	100
	502	81	17	0	0	0	0	0	0	0	2	0	0	100
	503	38	45	0	17	0	0	0	0	0	0	0	0	100
	504	57	36	0	0	0	0	0	0	0	7	0	0	100
	Mean	**59.60**	**35.00**	**.00**	**3.60**	**.00**	**.00**	**.00**	**.00**	**.00**	**1.80**	**.00**	**.00**	**100.00**
	StDev	**15.55**	**10.89**	**.00**	**7.50**	**.00**	**.00**	**.00**	**.00**	**.00**	**3.03**	**.00**	**.00**	**.00**
Endocladia	505	53	2	1	9	0	0	32	1	2	0	0	0	100
	506	63	1	0	35	0	0	1	0	0	0	0	0	100
	507	46	4	0	37	0	0	12	1	0	0	0	0	100
	508	45	8	0	29	0	0	14	2	0	2	0	0	100
	509	32	9	0	52	0	0	7	0	0	0	0	0	100
	Mean	**47.80**	**4.80**	**.20**	**32.40**	**.00**	**.00**	**13.20**	**.80**	**.40**	**.40**	**.00**	**.00**	**100.00**
	StDev	**11.39**	**3.56**	**.45**	**15.58**	**.00**	**.00**	**11.65**	**.84**	**.89**	**.89**	**.00**	**.00**	**.00**
Mussels	510	2	2	0	0	0	0	7	0	30	59	0	0	100
	511	3	0	0	0	0	0	5	0	34	58	0	0	100
	512	25	0	3	0	0	0	70	1	1	0	0	0	100
	513	11	0	3	0	0	0	11	0	29	46	0	0	100
	514	5	0	1	0	0	0	11	0	26	57	0	0	100
	Mean	**9.20**	**.40**	**1.40**	**.00**	**.00**	**.00**	**20.80**	**.20**	**24.00**	**44.00**	**.00**	**.00**	**100.00**
	StDev	**9.50**	**.89**	**1.52**	**.00**	**.00**	**.00**	**27.63**	**.45**	**13.17**	**25.15**	**.00**	**.00**	**.00**

Percent Cover of Index Species
NW Talcott, Santa Rosa Island - Spring 1999 (4/16/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	560	62	32	0	0	0	0	0	0	2	1	3	0	100
	561	33	43	0	0	0	1	0	0	21	0	2	0	100
	562	10	0	0	5	0	0	0	0	85	0	0	0	100
	563	34	1	0	2	0	56	0	0	7	0	0	0	100
	564	88	1	0	0	0	0	0	0	9	2	0	0	100
	Mean	**45.40**	**15.40**	**.00**	**1.40**	**.00**	**11.40**	**.00**	**.00**	**24.80**	**.60**	**1.00**	**.00**	**100.00**
	StDev	**30.11**	**20.55**	**.00**	**2.19**	**.00**	**24.94**	**.00**	**.00**	**34.37**	**.89**	**1.41**	**.00**	**.00**
Endocladia	555	22	0	0	38	0	36	0	0	4	0	0	0	100
	556	50	0	0	35	0	8	0	0	7	0	0	0	100
	557	5	0	0	27	0	67	0	0	1	0	0	0	100
	558	39	1	0	44	0	0	1	0	15	0	0	0	100
	559	48	0	0	2	0	0	4	0	46	0	0	0	100
	Mean	**32.80**	**.20**	**.00**	**29.20**	**.00**	**22.20**	**1.00**	**.00**	**14.60**	**.00**	**.00**	**.00**	**100.00**
	StDev	**19.07**	**.45**	**.00**	**16.39**	**.00**	**29.09**	**1.73**	**.00**	**18.31**	**.00**	**.00**	**.00**	**.00**
Rockweed	565	11	0	0	0	0	83	0	0	6	0	0	0	100
	566	14	0	0	0	0	85	0	0	1	0	0	0	100
	567	5	0	0	0	0	88	0	0	5	2	0	0	100
	568	46	0	0	28	0	26	0	0	0	0	0	0	100
	569	68	0	0	0	0	14	0	0	18	0	0	0	100
	Mean	**28.80**	**.00**	**.00**	**5.60**	**.00**	**59.20**	**.00**	**.00**	**6.00**	**.40**	**.00**	**.00**	**100.00**
	StDev	**27.09**	**.00**	**.00**	**12.52**	**.00**	**36.08**	**.00**	**.00**	**7.18**	**.89**	**.00**	**.00**	**.00**
Mussels	550	19	0	2	0	0	0	57	3	13	6	0	0	100
	551	13	0	1	0	0	0	51	0	29	6	0	0	100
	552	28	0	1	0	0	0	42	9	16	4	0	0	100
	553	15	1	3	0	0	0	21	3	57	0	0	0	100
	554	19	0	2	0	0	0	30	4	38	7	0	0	100
	Mean	**18.80**	**.20**	**1.80**	**.00**	**.00**	**.00**	**40.20**	**3.80**	**30.60**	**4.60**	**.00**	**.00**	**100.00**
	StDev	**5.76**	**.45**	**.84**	**.00**	**.00**	**.00**	**14.79**	**3.27**	**17.87**	**2.79**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 1999 (10/25/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	31	25	41	0	17	14	0	0	0	0	3	0	0	100
	32	20	16	0	35	13	14	0	0	1	1	0	0	100
	33	11	3	0	12	62	1	0	0	11	0	0	0	100
	35	28	41	0	6	16	1	0	0	4	4	0	0	100
	36	9	3	0	1	79	5	0	0	3	0	0	0	100
	37	19	12	0	10	33	21	0	0	5	0	0	0	100
	38	52	37	0	6	0	0	0	0	4	1	0	0	100
	39	47	28	0	2	14	0	0	0	6	3	0	0	100
	135	15	1	0	1	60	13	0	0	10	0	0	0	100
	Mean	**25.11**	**20.22**	**.00**	**10.00**	**32.33**	**6.11**	**.00**	**.00**	**4.89**	**1.33**	**.00**	**.00**	**100.00**
	StDev	**15.14**	**16.78**	**.00**	**10.82**	**27.80**	**7.88**	**.00**	**.00**	**3.69**	**1.58**	**.00**	**.00**	**.00**
Endocladia	13	26	7	7	47	0	0	1	0	11	1	0	0	100
	14	32	6	18	18	0	0	2	1	11	12	0	0	100
	19	27	6	0	33	15	15	0	0	2	2	0	0	100
	51	8	0	8	9	0	0	0	0	59	16	0	0	100
	52	10	0	2	42	0	0	1	0	41	4	0	0	100
	54	16	4	11	19	0	0	2	0	44	4	0	0	100
	212	28	6	5	46	0	1	1	0	7	6	0	0	100
	467	28	4	15	31	0	0	6	0	14	2	0	0	100
	492	14	6	3	41	2	14	3	0	14	3	0	0	100
	Mean	**21.00**	**4.33**	**7.67**	**31.78**	**1.89**	**3.33**	**1.78**	**.11**	**22.56**	**5.56**	**.00**	**.00**	**100.00**
	StDev	**8.97**	**2.65**	**6.04**	**13.68**	**4.96**	**6.34**	**1.86**	**.33**	**20.02**	**5.10**	**.00**	**.00**	**.00**
Rockweed	2	30	9	0	14	5	33	0	0	3	6	0	0	100
	3	17	6	0	5	51	15	0	0	4	2	0	0	100
	4	6	4	1	4	20	57	0	0	8	0	0	0	100
	5	19	20	9	19	2	13	1	0	13	4	0	0	100
	6	11	1	1	5	13	67	0	0	2	0	0	0	100
	8	16	1	0	1	4	78	0	0	0	0	0	0	100
	9	5	0	0	9	4	79	0	0	3	0	0	0	100
	10	3	1	0	0	18	73	0	0	5	0	0	0	100
	55	40	23	6	10	0	0	2	0	13	6	0	0	100
	Mean	**16.33**	**7.22**	**1.89**	**7.44**	**13.00**	**46.11**	**.33**	**.00**	**5.67**	**2.00**	**.00**	**.00**	**100.00**
	StDev	**12.23**	**8.63**	**3.30**	**6.19**	**15.95**	**31.10**	**.71**	**.00**	**4.69**	**2.65**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 1999 (10/25/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	10	0	32	0	0	0	30	2	25	1	0	0	100
	164	11	5	14	6	0	0	37	2	20	5	0	0	100
	203	12	1	17	0	0	0	44	1	18	7	0	0	100
	204	10	1	6	5	0	0	48	0	23	7	0	0	100
	468	10	1	17	2	0	0	10	0	54	6	0	0	100
	470	41	3	9	2	0	0	23	1	19	2	0	0	100
	471	21	2	12	2	0	0	14	0	46	3	0	0	100
	472	8	0	19	0	0	0	46	3	22	2	0	0	100
	473	32	1	5	1	0	0	28	0	22	11	0	0	100
	Mean	**17.22**	**1.56**	**14.56**	**2.00**	**.00**	**.00**	**31.11**	**1.00**	**27.67**	**4.89**	**.00**	**.00**	**100.00**
	StDev	**11.76**	**1.59**	**8.20**	**2.18**	**.00**	**.00**	**13.80**	**1.12**	**12.99**	**3.22**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Middle-East, Anacapa Island - Fall 1999 (11/23/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	243	37	10	14	7	0	0	3	0	29	0	0	0	100
	244	54	10	6	18	2	0	0	0	10	0	0	0	100
	245	57	20	8	12	0	0	0	0	2	1	0	0	100
	Mean	**49.33**	**13.33**	**9.33**	**12.33**	**.67**	**.00**	**1.00**	**.00**	**13.67**	**.33**	**.00**	**.00**	**100.00**
	StDev	**10.79**	**5.77**	**4.16**	**5.51**	**1.15**	**.00**	**1.73**	**.00**	**13.87**	**.58**	**.00**	**.00**	**.00**
Endocladia	240	18	0	2	30	5	24	0	0	21	0	0	0	100
	241	32	3	12	6	13	0	7	0	27	0	0	0	100
	242	24	4	1	20	34	0	0	0	17	0	0	0	100
	Mean	**24.67**	**2.33**	**5.00**	**18.67**	**17.33**	**8.00**	**2.33**	**.00**	**21.67**	**.00**	**.00**	**.00**	**100.00**
	StDev	**7.02**	**2.08**	**6.08**	**12.06**	**14.98**	**13.86**	**4.04**	**.00**	**5.03**	**.00**	**.00**	**.00**	**.00**
Rockweed	53	15	0	2	7	0	42	12	0	22	0	0	0	100
	237	5	0	0	2	3	83	0	0	7	0	0	0	100
	469	4	0	4	5	0	68	3	0	16	0	0	0	100
	Mean	**8.00**	**.00**	**2.00**	**4.67**	**1.00**	**64.33**	**5.00**	**.00**	**15.00**	**.00**	**.00**	**.00**	**100.00**
	StDev	**6.08**	**.00**	**2.00**	**2.52**	**1.73**	**20.74**	**6.24**	**.00**	**7.55**	**.00**	**.00**	**.00**	**.00**
Mussels	476	6	0	6	1	0	0	77	0	10	0	0	0	100
	477	3	0	11	0	0	0	76	0	9	1	0	0	100
	478	4	0	6	0	0	0	71	1	17	1	0	0	100
	Mean	**4.33**	**.00**	**7.67**	**.33**	**.00**	**.00**	**74.67**	**.33**	**12.00**	**.67**	**.00**	**.00**	**100.00**
	StDev	**1.53**	**.00**	**2.89**	**.58**	**.00**	**.00**	**3.21**	**.58**	**4.36**	**.58**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Middle-West, Anacapa Island - Fall 1999 (11/23/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	447	39	21	0	34	0	0	0	0	6	0	0	0	100
	448	21	15	2	41	0	0	0	0	21	0	0	0	100
	449	29	15	0	21	0	0	0	0	35	0	0	0	100
	450	46	19	0	13	7	0	0	0	15	0	0	0	100
	451	44	15	0	28	0	0	0	0	13	0	0	0	100
	Mean	**35.80**	**17.00**	**.40**	**27.40**	**1.40**	**.00**	**.00**	**.00**	**18.00**	**.00**	**.00**	**.00**	**100.00**
	StDev	**10.57**	**2.83**	**.89**	**10.92**	**3.13**	**.00**	**.00**	**.00**	**10.91**	**.00**	**.00**	**.00**	**.00**
Endocladia	457	39	21	0	34	0	0	0	0	6	0	0	0	100
	458	53	10	7	13	0	0	1	1	13	2	0	0	100
	459	44	5	2	29	0	0	2	0	18	0	0	0	100
	460	39	8	1	49	0	0	0	0	3	0	0	0	100
	461	47	0	0	37	16	0	0	0	0	0	0	0	100
	Mean	**44.40**	**8.80**	**2.00**	**32.40**	**3.20**	**.00**	**.60**	**.20**	**8.00**	**.40**	**.00**	**.00**	**100.00**
	StDev	**5.90**	**7.79**	**2.92**	**13.11**	**7.16**	**.00**	**.89**	**.45**	**7.38**	**.89**	**.00**	**.00**	**.00**
Rockweed	452	24	3	1	7	0	64	0	0	1	0	0	0	100
	453	16	0	0	3	0	80	0	0	1	0	0	0	100
	454	24	0	8	8	0	0	2	0	56	2	0	0	100
	455	13	0	0	2	0	75	3	0	7	0	0	0	100
	456	17	0	0	0	0	77	1	0	5	0	0	0	100
	Mean	**18.80**	**.60**	**1.80**	**4.00**	**.00**	**59.20**	**1.20**	**.00**	**14.00**	**.40**	**.00**	**.00**	**100.00**
	StDev	**4.97**	**1.34**	**3.49**	**3.39**	**.00**	**33.64**	**1.30**	**.00**	**23.62**	**.89**	**.00**	**.00**	**.00**
Mussels	462	26	6	3	4	0	0	37	0	24	0	0	0	100
	463	32	3	3	1	0	0	28	0	32	1	0	0	100
	464	6	2	6	1	0	0	66	0	19	0	0	0	100
	465	10	2	6	0	0	0	73	0	6	3	0	0	100
	466	1	0	0	0	0	0	95	0	4	0	0	0	100
	Mean	**15.00**	**2.60**	**3.60**	**1.20**	**.00**	**.00**	**59.80**	**.00**	**17.00**	**.80**	**.00**	**.00**	**100.00**
	StDev	**13.34**	**2.19**	**2.51**	**1.64**	**.00**	**.00**	**27.31**	**.00**	**11.92**	**1.30**	**.00**	**.00**	**.00**

Percent Cover of Index Species
S Frenchy's Cove, Anacapa Island - Fall 1999 (10/24/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	249	40	30	0	24	0	0	0	0	0	5	1	0	100
	250	41	27	0	18	0	0	0	0	2	10	2	0	100
	251	63	27	0	3	0	0	0	0	0	5	2	0	100
	252	57	26	0	5	0	0	0	0	6	3	3	0	100
	253	31	47	0	16	0	0	0	0	0	6	0	0	100
	Mean	**46.40**	**31.40**	**.00**	**13.20**	**.00**	**.00**	**.00**	**.00**	**1.60**	**5.80**	**1.60**	**.00**	**100.00**
	StDev	**13.18**	**8.85**	**.00**	**8.93**	**.00**	**.00**	**.00**	**.00**	**2.61**	**2.59**	**1.14**	**.00**	**.00**
Endocladia	154	35	4	0	55	0	0	0	0	3	2	1	0	100
	155	15	2	0	72	0	7	0	0	0	2	2	0	100
	256	29	0	0	50	10	9	0	0	0	1	1	0	100
	257	11	0	0	85	0	0	0	0	4	0	0	0	100
	258	16	0	0	34	0	48	0	0	2	0	0	0	100
	Mean	**21.20**	**1.20**	**.00**	**59.20**	**2.00**	**12.80**	**.00**	**.00**	**1.80**	**1.00**	**.80**	**.00**	**100.00**
	StDev	**10.26**	**1.79**	**.00**	**19.79**	**4.47**	**20.09**	**.00**	**.00**	**1.79**	**1.00**	**.84**	**.00**	**.00**
Rockweed	259	1	0	0	0	0	97	0	0	2	0	0	0	100
	260	21	2	0	21	4	43	0	0	9	0	0	0	100
	261	3	0	0	0	0	92	0	0	5	0	0	0	100
	262	69	9	0	4	0	7	0	0	10	1	0	0	100
	263	11	0	0	0	0	87	0	0	2	0	0	0	100
	Mean	**21.00**	**2.20**	**.00**	**5.00**	**.80**	**65.20**	**.00**	**.00**	**5.60**	**.20**	**.00**	**.00**	**100.00**
	StDev	**27.96**	**3.90**	**.00**	**9.11**	**1.79**	**39.00**	**.00**	**.00**	**3.78**	**.45**	**.00**	**.00**	**.00**
Mussels	201	1	0	0	0	0	0	32	0	67	0	0	0	100
	202	7	0	0	0	0	0	52	0	34	7	0	0	100
	264	3	0	0	0	0	0	50	0	45	2	0	0	100
	265	15	0	1	0	0	0	59	0	22	3	0	0	100
	266	17	0	0	3	0	0	58	0	16	6	0	0	100
	Mean	**8.60**	**.00**	**.20**	**.60**	**.00**	**.00**	**50.20**	**.00**	**36.80**	**3.60**	**.00**	**.00**	**100.00**
	StDev	**7.13**	**.00**	**.45**	**1.34**	**.00**	**.00**	**10.87**	**.00**	**20.24**	**2.88**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Crook Point, San Miguel Island - Fall 1999 (1/5/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	137	73	25	0	0	0	0	0	0	0	2	0	0	100
	147	61	33	0	0	0	0	0	0	4	2	0	0	100
	148	63	36	0	0	0	0	0	0	0	1	0	0	100
	149	74	21	0	3	0	0	2	0	0	0	0	0	100
	495	45	47	0	6	0	0	0	0	1	1	0	0	100
	Mean	**63.20**	**32.40**	**.00**	**1.80**	**.00**	**.00**	**.40**	**.00**	**1.00**	**1.20**	**.00**	**.00**	**100.00**
	StDev	**11.71**	**10.14**	**.00**	**2.68**	**.00**	**.00**	**.89**	**.00**	**1.73**	**.84**	**.00**	**.00**	**.00**
Endocladia	386	61	11	0	22	0	0	0	0	0	6	0	0	100
	387	57	13	2	8	0	0	2	2	11	5	0	0	100
	388	75	5	0	17	0	0	0	0	2	1	0	0	100
	389	33	6	3	25	1	4	25	1	2	0	0	0	100
	390	37	7	0	18	0	0	11	3	22	2	0	0	100
	Mean	**52.60**	**8.40**	**1.00**	**18.00**	**.20**	**.80**	**7.60**	**1.20**	**7.40**	**2.80**	**.00**	**.00**	**100.00**
	StDev	**17.46**	**3.44**	**1.41**	**6.44**	**.45**	**1.79**	**10.74**	**1.30**	**9.21**	**2.59**	**.00**	**.00**	**.00**
Rockweed	396	48	7	0	10	0	11	13	5	4	2	0	0	100
	397	16	2	0	0	0	0	74	0	6	2	0	0	100
	398	51	4	0	10	0	13	17	2	1	2	0	0	100
	399	20	3	0	1	0	1	0	0	75	0	0	0	100
	400	71	1	2	6	0	10	0	0	2	8	0	0	100
	Mean	**41.20**	**3.40**	**.40**	**5.40**	**.00**	**7.00**	**20.80**	**1.40**	**17.60**	**2.80**	**.00**	**.00**	**100.00**
	StDev	**22.99**	**2.30**	**.89**	**4.77**	**.00**	**6.04**	**30.70**	**2.19**	**32.14**	**3.03**	**.00**	**.00**	**.00**
Mussels	381	25	2	2	0	0	0	45	3	20	3	0	0	100
	382	1	0	0	0	0	0	99	0	0	0	0	0	100
	383	6	0	0	0	0	0	90	0	4	0	0	0	100
	384	4	4	0	0	0	0	84	3	5	0	0	0	100
	385	10	3	1	0	0	0	83	3	0	0	0	0	100
	Mean	**9.20**	**1.80**	**.60**	**.00**	**.00**	**.00**	**80.20**	**1.80**	**5.80**	**.60**	**.00**	**.00**	**100.00**
	StDev	**9.42**	**1.79**	**.89**	**.00**	**.00**	**.00**	**20.68**	**1.64**	**8.26**	**1.34**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Cuyler Harbor, San Miguel Island - Fall 1999 (1/3/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	416	64	35	0	0	0	0	1	0	0	0	0	0	100
	417	54	45	0	0	0	0	0	0	1	0	0	0	100
	418	48	50	0	0	0	0	0	0	2	0	0	0	100
	419	71	18	0	10	0	1	0	0	0	0	0	0	100
	420	71	14	0	13	0	0	0	0	2	0	0	0	100
	Mean	**61.60**	**32.40**	**.00**	**4.60**	**.00**	**.20**	**.20**	**.00**	**1.00**	**.00**	**.00**	**.00**	**100.00**
	StDev	**10.31**	**15.98**	**.00**	**6.39**	**.00**	**.45**	**.45**	**.00**	**1.00**	**.00**	**.00**	**.00**	**.00**
Endocladia	411	56	2	1	27	0	0	6	0	5	3	0	0	100
	412	26	34	0	29	0	0	8	0	3	0	0	0	100
	413	33	1	0	13	0	49	0	0	4	0	0	0	100
	414	56	0	0	36	0	0	0	0	6	2	0	0	100
	415	59	1	0	35	0	0	0	0	4	1	0	0	100
	Mean	**46.00**	**7.60**	**.20**	**28.00**	**.00**	**9.80**	**2.80**	**.00**	**4.40**	**1.20**	**.00**	**.00**	**100.00**
	StDev	**15.31**	**14.77**	**.45**	**9.22**	**.00**	**21.91**	**3.90**	**.00**	**1.14**	**1.30**	**.00**	**.00**	**.00**
Rockweed	406	13	0	0	0	0	67	1	0	9	10	0	0	100
	407	12	1	0	0	0	70	0	0	15	2	0	0	100
	408	4	1	0	0	0	92	0	0	2	1	0	0	100
	409	1	0	0	0	0	94	0	0	4	1	0	0	100
	410	7	0	0	0	0	89	0	0	2	2	0	0	100
	Mean	**7.40**	**.40**	**.00**	**.00**	**.00**	**82.40**	**.20**	**.00**	**6.40**	**3.20**	**.00**	**.00**	**100.00**
	StDev	**5.13**	**.55**	**.00**	**.00**	**.00**	**12.86**	**.45**	**.00**	**5.59**	**3.83**	**.00**	**.00**	**.00**
Mussels	401	21	0	6	0	0	0	66	0	2	5	0	0	100
	402	2	0	0	0	0	0	87	2	2	7	0	0	100
	403	5	0	3	0	0	0	80	0	0	12	0	0	100
	404	20	0	16	0	0	0	40	0	6	18	0	0	100
	405	51	0	13	0	0	0	23	0	7	6	0	0	100
	Mean	**19.80**	**.00**	**7.60**	**.00**	**.00**	**.00**	**59.20**	**.40**	**3.40**	**9.60**	**.00**	**.00**	**100.00**
	StDev	**19.43**	**.00**	**6.73**	**.00**	**.00**	**.00**	**27.07**	**.89**	**2.97**	**5.41**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Harris Point, San Miguel Island - Fall 1999 (1/6/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	436	41	18	13	1	0	0	10	0	12	5	0	0	100
	437	20	4	22	0	0	0	26	1	26	1	0	0	100
	438	16	0	2	0	0	0	0	0	81	1	0	0	100
	439	55	7	8	7	0	0	9	0	11	3	0	0	100
	440	63	37	0	0	0	0	0	0	0	0	0	0	100
	Mean	**39.00**	**13.20**	**9.00**	**1.60**	**.00**	**.00**	**9.00**	**.20**	**26.00**	**2.00**	**.00**	**.00**	**100.00**
	StDev	**20.77**	**14.89**	**8.89**	**3.05**	**.00**	**.00**	**10.63**	**.45**	**32.10**	**2.00**	**.00**	**.00**	**.00**
Endocladia	431	55	14	3	17	0	0	5	0	4	2	0	0	100
	432	30	4	0	61	0	0	0	0	4	0	1	0	100
	433	35	6	0	55	0	0	2	0	1	1	0	0	100
	434	57	0	0	38	4	0	0	0	1	0	0	0	100
	435	50	3	1	34	5	0	0	0	5	2	0	0	100
	Mean	**45.40**	**5.40**	**.80**	**41.00**	**1.80**	**.00**	**1.40**	**.00**	**3.00**	**1.00**	**.20**	**.00**	**100.00**
	StDev	**12.18**	**5.27**	**1.30**	**17.54**	**2.49**	**.00**	**2.19**	**.00**	**1.87**	**1.00**	**.45**	**.00**	**.00**
Rockweed	421	27	0	0	22	51	0	0	0	0	0	0	0	100
	422	34	2	0	28	25	0	0	0	8	2	1	0	100
	423	24	2	0	50	22	0	0	0	2	0	0	0	100
	424	79	1	0	14	6	0	0	0	0	0	0	0	100
	425	50	4	0	2	42	0	0	0	2	0	0	0	100
	Mean	**42.80**	**1.80**	**.00**	**23.20**	**29.20**	**.00**	**.00**	**.00**	**2.40**	**.40**	**.20**	**.00**	**100.00**
	StDev	**22.60**	**1.48**	**.00**	**17.87**	**17.66**	**.00**	**.00**	**.00**	**3.29**	**.89**	**.45**	**.00**	**.00**
Mussels	426	32	0	1	0	0	0	55	4	8	0	0	0	100
	427	49	4	2	6	0	0	27	0	11	1	0	0	100
	428	57	3	1	2	0	0	34	0	1	2	0	0	100
	429	41	2	4	0	0	0	48	0	3	2	0	0	100
	430	25	0	5	0	0	0	56	0	13	1	0	0	100
	Mean	**40.80**	**1.80**	**2.60**	**1.60**	**.00**	**.00**	**44.00**	**.80**	**7.20**	**1.20**	**.00**	**.00**	**100.00**
	StDev	**12.81**	**1.79**	**1.82**	**2.61**	**.00**	**.00**	**12.94**	**1.79**	**5.12**	**.84**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Otter Harbor, San Miguel Island - Fall 1999 (1/4/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	370	4	10	0	0	0	0	0	0	86	0	0	0	100
	371	27	47	0	0	0	0	0	0	21	0	5	0	100
	372	68	32	0	0	0	0	0	0	0	0	0	0	100
	373	31	36	0	0	0	0	0	0	26	0	7	0	100
	374	2	0	0	0	0	0	0	0	98	0	0	0	100
	Mean	**26.40**	**25.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**46.20**	**.00**	**2.40**	**.00**	**100.00**
	StDev	**26.69**	**19.39**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**43.14**	**.00**	**3.36**	**.00**	**.00**
Endocladia	360	21	0	0	39	0	13	3	2	22	0	0	0	100
	361	20	0	0	42	0	27	1	0	9	1	0	0	100
	362	17	0	0	75	0	0	3	0	5	0	0	0	100
	363	9	0	0	32	4	43	1	0	11	0	0	0	100
	364	12	0	0	54	3	18	0	0	12	1	0	0	100
	Mean	**15.80**	**.00**	**.00**	**48.40**	**1.40**	**20.20**	**1.60**	**.40**	**11.80**	**.40**	**.00**	**.00**	**100.00**
	StDev	**5.17**	**.00**	**.00**	**16.86**	**1.95**	**16.05**	**1.34**	**.89**	**6.30**	**.55**	**.00**	**.00**	**.00**
Rockweed	355	18	0	0	23	19	39	0	0	1	0	0	0	100
	356	3	0	0	16	0	73	0	0	8	0	0	0	100
	357	11	0	1	24	3	46	0	0	15	0	0	0	100
	358	45	0	0	21	0	22	0	0	12	0	0	0	100
	359	34	46	0	15	1	0	0	0	3	0	1	0	100
	Mean	**22.20**	**9.20**	**.20**	**19.80**	**4.60**	**36.00**	**.00**	**.00**	**7.80**	**.00**	**.20**	**.00**	**100.00**
	StDev	**17.11**	**20.57**	**.45**	**4.09**	**8.14**	**27.25**	**.00**	**.00**	**5.89**	**.00**	**.45**	**.00**	**.00**
Mussels	375	9	0	2	0	0	0	69	8	12	0	0	0	100
	376	19	0	2	0	0	0	55	1	20	3	0	0	100
	378	13	0	0	0	0	0	56	15	16	0	0	0	100
	379	13	0	4	1	0	0	56	11	15	0	0	0	100
	380	4	1	0	0	0	0	80	0	15	0	0	0	100
	Mean	**11.60**	**.20**	**1.60**	**.20**	**.00**	**.00**	**63.20**	**7.00**	**15.60**	**.60**	**.00**	**.00**	**100.00**
	StDev	**5.55**	**.45**	**1.67**	**.45**	**.00**	**.00**	**11.03**	**6.44**	**2.88**	**1.34**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 1999 (12/8/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	876	12	14	0	67	0	0	3	2	2	0	0	0	100
	877	35	11	0	48	0	0	3	0	2	1	0	0	100
	878	45	26	0	8	0	0	0	0	19	0	2	0	100
	879	45	38	0	12	0	0	0	0	0	0	5	0	100
	880	22	18	0	47	0	0	0	0	12	0	1	0	100
	Mean	**31.80**	**21.40**	**.00**	**36.40**	**.00**	**.00**	**1.20**	**.40**	**7.00**	**.20**	**1.60**	**.00**	**100.00**
	StDev	**14.55**	**10.85**	**.00**	**25.42**	**.00**	**.00**	**1.64**	**.89**	**8.19**	**.45**	**2.07**	**.00**	**.00**
Endocladia	881	16	25	0	37	0	0	7	0	14	1	0	0	100
	882	14	16	0	61	0	0	2	0	7	0	0	0	100
	883	19	0	0	54	21	0	2	0	3	1	0	0	100
	884	16	2	0	82	0	0	0	0	0	0	0	0	100
	885	18	2	0	67	0	0	0	0	12	0	1	0	100
	Mean	**16.60**	**9.00**	**.00**	**60.20**	**4.20**	**.00**	**2.20**	**.00**	**7.20**	**.40**	**.20**	**.00**	**100.00**
	StDev	**1.95**	**11.00**	**.00**	**16.57**	**9.39**	**.00**	**2.86**	**.00**	**5.89**	**.55**	**.45**	**.00**	**.00**
Rockweed	896	6	1	0	10	0	79	0	0	3	1	0	0	100
	897	11	1	0	2	3	61	0	0	22	0	0	0	100
	898	10	0	0	1	0	85	0	0	4	0	0	0	100
	899	9	1	0	5	7	78	0	0	0	0	0	0	100
	900	12	2	0	0	7	78	0	0	0	1	0	0	100
	Mean	**9.60**	**1.00**	**.00**	**3.60**	**3.40**	**76.20**	**.00**	**.00**	**5.80**	**.40**	**.00**	**.00**	**100.00**
	StDev	**2.30**	**.71**	**.00**	**4.04**	**3.51**	**8.98**	**.00**	**.00**	**9.23**	**.55**	**.00**	**.00**	**.00**
Mussels	891	12	0	0	0	0	0	50	0	18	20	0	0	100
	892	25	2	0	0	0	0	56	1	11	5	0	0	100
	893	6	0	0	1	0	0	76	2	3	12	0	0	100
	894	8	0	0	0	0	0	86	2	0	4	0	0	100
	895	3	1	0	0	0	0	76	9	2	9	0	0	100
	Mean	**10.80**	**.60**	**.00**	**.20**	**.00**	**.00**	**68.80**	**2.80**	**6.80**	**10.00**	**.00**	**.00**	**100.00**
	StDev	**8.58**	**.89**	**.00**	**.45**	**.00**	**.00**	**15.14**	**3.56**	**7.53**	**6.44**	**.00**	**.00**	**.00**
Pollicipes	901	23	13	2	2	0	0	34	9	12	5	0	0	100
	902	45	14	4	3	0	0	10	4	15	5	0	0	100
	903	2	0	0	0	0	0	53	24	5	16	0	0	100
	904	2	0	0	0	0	0	60	20	10	8	0	0	100
	905	3	0	0	0	0	0	47	32	3	15	0	0	100
	Mean	**15.00**	**5.40**	**1.20**	**1.00**	**.00**	**.00**	**40.80**	**17.80**	**9.00**	**9.80**	**.00**	**.00**	**100.00**
	StDev	**19.01**	**7.40**	**1.79**	**1.41**	**.00**	**.00**	**19.69**	**11.32**	**4.95**	**5.36**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 1999 (12/8/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Tar	906	28	19	0	0	0	0	0	0	0	0	53	0	100
	907	35	28	0	0	0	0	0	0	0	1	36	0	100
	908	21	23	0	0	0	0	0	0	0	2	54	0	100
	909	31	23	0	0	0	0	0	0	5	0	41	0	100
	910	25	8	0	0	0	0	0	0	0	0	67	0	100
	Mean	**28.00**	**20.20**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**1.00**	**.60**	**50.20**	**.00**	**100.00**
	StDev	**5.39**	**7.53**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**2.24**	**.89**	**12.15**	**.00**	**.00**
Hesperophycus	886	61	1	0	2	5	0	0	0	31	0	0	0	100
	887	65	2	0	11	5	0	0	0	17	0	0	0	100
	888	34	15	0	25	24	1	0	1	0	0	0	0	100
	889	62	4	0	8	5	1	0	0	20	0	0	0	100
	890	27	10	0	13	24	21	0	0	5	0	0	0	100
	Mean	**49.80**	**6.40**	**.00**	**11.80**	**12.60**	**4.60**	**.00**	**.20**	**14.60**	**.00**	**.00**	**.00**	**100.00**
	StDev	**17.85**	**5.94**	**.00**	**8.47**	**10.41**	**9.18**	**.00**	**.45**	**12.34**	**.00**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Fall 1999 (12/9/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	826	97	0	0	0	0	0	0	0	3	0	0	0	100
	827	35	0	0	0	0	29	0	0	35	1	0	0	100
	828	36	12	2	22	0	17	0	0	9	2	0	0	100
	829	40	33	1	11	0	1	0	0	9	5	0	0	100
	830	38	25	0	7	0	2	0	0	27	1	0	0	100
	Mean	**49.20**	**14.00**	**.60**	**8.00**	**.00**	**9.80**	**.00**	**.00**	**16.60**	**1.80**	**.00**	**.00**	**100.00**
	StDev	**26.79**	**14.82**	**.89**	**9.14**	**.00**	**12.79**	**.00**	**.00**	**13.67**	**1.92**	**.00**	**.00**	**.00**
Endocladia	831	46	1	0	19	0	0	0	0	30	4	0	0	100
	832	15	30	0	40	6	0	1	0	7	1	0	0	100
	833	27	35	0	34	1	0	0	0	0	3	0	0	100
	834	30	25	0	41	0	0	0	0	3	1	0	0	100
	835	30	20	0	39	1	0	0	0	8	2	0	0	100
	Mean	**29.60**	**22.20**	**.00**	**34.60**	**1.60**	**.00**	**.20**	**.00**	**9.60**	**2.20**	**.00**	**.00**	**100.00**
	StDev	**11.06**	**13.10**	**.00**	**9.13**	**2.51**	**.00**	**.45**	**.00**	**11.84**	**1.30**	**.00**	**.00**	**.00**
Rockweed	846	1	0	0	0	0	99	0	0	0	0	0	0	100
	847	4	0	0	0	0	83	0	0	13	0	0	0	100
	848	1	0	0	0	0	96	0	0	3	0	0	0	100
	849	0	0	0	0	0	95	0	0	3	2	0	0	100
	850	0	0	0	0	0	97	0	0	3	0	0	0	100
	Mean	**1.20**	**.00**	**.00**	**.00**	**.00**	**94.00**	**.00**	**.00**	**4.40**	**.40**	**.00**	**.00**	**100.00**
	StDev	**1.64**	**.00**	**.00**	**.00**	**.00**	**6.32**	**.00**	**.00**	**4.98**	**.89**	**.00**	**.00**	**.00**
Mussels	841	13	3	2	0	0	0	38	0	28	16	0	0	100
	842	2	0	0	0	0	0	85	0	6	7	0	0	100
	843	11	0	1	0	0	0	70	0	7	11	0	0	100
	844	1	0	0	0	0	0	64	0	23	12	0	0	100
	845	24	7	1	0	0	0	29	0	22	17	0	0	100
	Mean	**10.20**	**2.00**	**.80**	**.00**	**.00**	**.00**	**57.20**	**.00**	**17.20**	**12.60**	**.00**	**.00**	**100.00**
	StDev	**9.36**	**3.08**	**.84**	**.00**	**.00**	**.00**	**23.17**	**.00**	**10.03**	**4.04**	**.00**	**.00**	**.00**
Hesperophycus	836	25	19	0	29	17	0	0	0	9	1	0	0	100
	837	45	22	0	19	9	0	1	0	2	2	0	0	100
	838	62	9	0	9	14	0	0	0	4	2	0	0	100
	839	50	36	0	7	0	6	0	0	0	1	0	0	100
	840	39	40	0	15	1	1	0	0	0	4	0	0	100
	Mean	**44.20**	**25.20**	**.00**	**15.80**	**8.20**	**1.40**	**.20**	**.00**	**3.00**	**2.00**	**.00**	**.00**	**100.00**
	StDev	**13.66**	**12.72**	**.00**	**8.79**	**7.60**	**2.61**	**.45**	**.00**	**3.74**	**1.22**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Trailer, Santa Cruz Island - Fall 1999 (12/7/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	911	59	18	0	16	0	0	0	0	3	4	0	0	100
	912	71	28	0	0	0	0	0	0	0	1	0	0	100
	913	58	31	0	7	0	0	0	0	1	3	0	0	100
	914	72	27	0	0	0	0	0	0	0	1	0	0	100
	915	60	37	0	0	0	0	0	0	0	3	0	0	100
	Mean	**64.00**	**28.20**	**.00**	**4.60**	**.00**	**.00**	**.00**	**.00**	**.80**	**2.40**	**.00**	**.00**	**100.00**
	StDev	**6.89**	**6.91**	**.00**	**7.06**	**.00**	**.00**	**.00**	**.00**	**1.30**	**1.34**	**.00**	**.00**	**.00**
Rockweed	926	13	0	0	0	0	81	0	0	5	1	0	0	100
	927	18	0	0	0	0	82	0	0	0	0	0	0	100
	928	12	0	0	0	0	79	0	0	7	2	0	0	100
	929	0	0	0	0	0	100	0	0	0	0	0	0	100
	930	8	2	0	0	0	86	0	0	4	0	0	0	100
	Mean	**10.20**	**.40**	**.00**	**.00**	**.00**	**85.60**	**.00**	**.00**	**3.20**	**.60**	**.00**	**.00**	**100.00**
	StDev	**6.72**	**.89**	**.00**	**.00**	**.00**	**8.44**	**.00**	**.00**	**3.11**	**.89**	**.00**	**.00**	**.00**
Mussels	921	17	2	1	0	0	0	69	0	2	9	0	0	100
	922	12	0	0	0	0	0	43	0	28	17	0	0	100
	923	18	0	0	0	0	0	47	0	25	10	0	0	100
	924	36	2	1	0	0	0	43	1	9	8	0	0	100
	925	33	1	1	4	0	0	44	0	13	4	0	0	100
	Mean	**23.20**	**1.00**	**.60**	**.80**	**.00**	**.00**	**49.20**	**.20**	**15.40**	**9.60**	**.00**	**.00**	**100.00**
	StDev	**10.62**	**1.00**	**.55**	**1.79**	**.00**	**.00**	**11.19**	**.45**	**10.92**	**4.72**	**.00**	**.00**	**.00**
Hesperophycus	916	63	3	0	14	6	12	0	0	1	1	0	0	100
	917	34	4	0	13	7	42	0	0	0	0	0	0	100
	918	43	3	0	9	20	22	0	0	3	0	0	0	100
	919	52	3	0	7	18	19	0	0	1	0	0	0	100
	920	45	9	0	17	23	1	0	0	4	1	0	0	100
	Mean	**47.40**	**4.40**	**.00**	**12.00**	**14.80**	**19.20**	**.00**	**.00**	**1.80**	**.40**	**.00**	**.00**	**100.00**
	StDev	**10.83**	**2.61**	**.00**	**4.00**	**7.79**	**15.09**	**.00**	**.00**	**1.64**	**.55**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Fall 1999 (12/6/99)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Endocladia	931	76	2	0	19	0	0	0	0	0	3	0	0	100
	932	56	3	0	38	0	0	0	0	0	3	0	0	100
	933	69	2	0	26	0	0	0	0	0	3	0	0	100
	934	76	4	0	16	0	0	0	0	2	2	0	0	100
	935	75	1	0	13	0	0	0	0	2	9	0	0	100
	Mean	**70.40**	**2.40**	**.00**	**22.40**	**.00**	**.00**	**.00**	**.00**	**.80**	**4.00**	**.00**	**.00**	**100.00**
	StDev	**8.56**	**1.14**	**.00**	**9.96**	**.00**	**.00**	**.00**	**.00**	**1.10**	**2.83**	**.00**	**.00**	**.00**
Rockweed	946	57	0	0	25	0	1	0	0	11	5	1	0	100
	947	66	3	1	11	0	0	0	0	18	1	0	0	100
	948	1	0	0	1	0	97	0	0	1	0	0	0	100
	949	1	0	0	0	0	95	0	0	4	0	0	0	100
	950	23	0	0	1	0	57	0	0	16	3	0	0	100
	Mean	**29.60**	**.60**	**.20**	**7.60**	**.00**	**50.00**	**.00**	**.00**	**10.00**	**1.80**	**.20**	**.00**	**100.00**
	StDev	**30.64**	**1.34**	**.45**	**10.71**	**.00**	**47.92**	**.00**	**.00**	**7.38**	**2.17**	**.45**	**.00**	**.00**
Mussels	941	18	0	18	0	0	0	26	2	28	8	0	0	100
	942	14	0	1	0	0	0	51	7	19	8	0	0	100
	943	14	0	1	0	0	0	49	6	21	9	0	0	100
	944	19	0	1	0	0	0	40	10	21	9	0	0	100
	945	3	0	0	0	0	0	60	4	19	14	0	0	100
	Mean	**13.60**	**.00**	**4.20**	**.00**	**.00**	**.00**	**45.20**	**5.80**	**21.60**	**9.60**	**.00**	**.00**	**100.00**
	StDev	**6.35**	**.00**	**7.73**	**.00**	**.00**	**.00**	**12.87**	**3.03**	**3.71**	**2.51**	**.00**	**.00**	**.00**
Hesperophycus	936	90	3	0	0	0	0	0	0	2	5	0	0	100
	937	49	4	0	11	11	2	0	0	21	2	0	0	100
	938	82	7	0	1	2	0	0	0	6	2	0	0	100
	939	21	0	0	0	0	74	0	0	5	0	0	0	100
	940	44	3	0	8	13	21	0	0	10	1	0	0	100
	Mean	**57.20**	**3.40**	**.00**	**4.00**	**5.20**	**19.40**	**.00**	**.00**	**8.80**	**2.00**	**.00**	**.00**	**100.00**
	StDev	**28.47**	**2.51**	**.00**	**5.15**	**6.30**	**31.78**	**.00**	**.00**	**7.40**	**1.87**	**.00**	**.00**	**.00**

Percent Cover of Index Species
East Point, Santa Rosa Island - Fall 1999 (1/17/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	575	57	26	0	0	0	0	1	0	16	0	0	0	100
	576	29	20	0	28	0	17	0	0	6	0	0	0	100
	577	18	38	0	36	1	1	0	0	6	0	0	0	100
	578	72	26	0	2	0	0	0	0	0	0	0	0	100
	579	64	33	0	3	0	0	0	0	0	0	0	0	100
	Mean	**48.00**	**28.60**	**.00**	**13.80**	**.20**	**3.60**	**.20**	**.00**	**5.60**	**.00**	**.00**	**.00**	**100.00**
	StDev	**23.31**	**6.99**	**.00**	**16.89**	**.45**	**7.50**	**.45**	**.00**	**6.54**	**.00**	**.00**	**.00**	**.00**
Endocladia	580	7	1	0	79	6	7	0	0	0	0	0	0	100
	581	19	5	0	65	11	0	0	0	0	0	0	0	100
	582	7	1	0	54	32	6	0	0	0	0	0	0	100
	583	8	3	0	79	8	0	0	0	2	0	0	0	100
	584	8	2	0	80	0	6	0	0	1	3	0	0	100
	Mean	**9.80**	**2.40**	**.00**	**71.40**	**11.40**	**3.80**	**.00**	**.00**	**.60**	**.60**	**.00**	**.00**	**100.00**
	StDev	**5.17**	**1.67**	**.00**	**11.55**	**12.20**	**3.49**	**.00**	**.00**	**.89**	**1.34**	**.00**	**.00**	**.00**
Rockweed	585	7	0	0	0	0	83	0	0	10	0	0	0	100
	586	14	0	0	0	0	74	0	0	11	1	0	0	100
	587	1	0	0	0	0	97	0	0	2	0	0	0	100
	588	1	1	0	0	0	84	0	0	12	2	0	0	100
	589	1	0	0	0	0	94	0	0	4	1	0	0	100
	Mean	**4.80**	**.20**	**.00**	**.00**	**.00**	**86.40**	**.00**	**.00**	**7.80**	**.80**	**.00**	**.00**	**100.00**
	StDev	**5.76**	**.45**	**.00**	**.00**	**.00**	**9.24**	**.00**	**.00**	**4.49**	**.84**	**.00**	**.00**	**.00**
Mussels	590	4	0	0	0	0	0	84	0	4	8	0	0	100
	591	6	3	0	0	0	0	65	0	8	18	0	0	100
	592	0	0	0	0	0	0	88	0	9	3	0	0	100
	593	1	0	0	0	0	0	94	0	3	2	0	0	100
	594	1	0	0	0	0	0	84	0	8	7	0	0	100
	Mean	**2.40**	**.60**	**.00**	**.00**	**.00**	**.00**	**83.00**	**.00**	**6.40**	**7.60**	**.00**	**.00**	**100.00**
	StDev	**2.51**	**1.34**	**.00**	**.00**	**.00**	**.00**	**10.86**	**.00**	**2.70**	**6.35**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Ford Point, Santa Rosa Island - Fall 1999 (1/18/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	520	87	8	0	0	0	0	0	0	1	4	0	0	100
	521	67	27	0	0	0	0	0	0	3	3	0	0	100
	522	76	16	0	0	0	0	0	0	0	8	0	0	100
	523	33	37	25	0	0	0	0	0	1	4	0	0	100
	524	68	24	1	0	0	0	0	0	2	5	0	0	100
	Mean	**66.20**	**22.40**	**5.20**	**.00**	**.00**	**.00**	**.00**	**.00**	**1.40**	**4.80**	**.00**	**.00**	**100.00**
	StDev	**20.22**	**11.01**	**11.08**	**.00**	**.00**	**.00**	**.00**	**.00**	**1.14**	**1.92**	**.00**	**.00**	**.00**
Endocladia	525	25	1	0	49	0	0	7	0	16	2	0	0	100
	526	46	2	0	33	0	0	10	0	6	3	0	0	100
	527	36	3	0	34	0	0	10	0	13	4	0	0	100
	528	41	0	0	39	0	0	7	0	11	2	0	0	100
	529	33	0	0	58	0	0	5	0	4	0	0	0	100
	Mean	**36.20**	**1.20**	**.00**	**42.60**	**.00**	**.00**	**7.80**	**.00**	**10.00**	**2.20**	**.00**	**.00**	**100.00**
	StDev	**7.98**	**1.30**	**.00**	**10.69**	**.00**	**.00**	**2.17**	**.00**	**4.95**	**1.48**	**.00**	**.00**	**.00**
Mussels	530	56	3	0	2	0	0	14	0	16	9	0	0	100
	531	0	0	0	0	0	0	100	0	0	0	0	0	100
	532	0	0	0	0	0	0	100	0	0	0	0	0	100
	533	33	0	0	1	0	0	55	0	11	0	0	0	100
	534	49	0	0	0	0	0	11	3	31	6	0	0	100
	Mean	**27.60**	**.60**	**.00**	**.60**	**.00**	**.00**	**56.00**	**.60**	**11.60**	**3.00**	**.00**	**.00**	**100.00**
	StDev	**26.54**	**1.34**	**.00**	**.89**	**.00**	**.00**	**43.77**	**1.34**	**12.90**	**4.24**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Fall 1999 (1/19/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	605	58	39	0	2	0	0	0	0	0	1	0	0	100
	606	46	37	0	0	0	0	0	0	2	2	13	0	100
	607	55	42	0	0	0	0	0	0	0	2	1	0	100
	608	67	27	0	0	0	0	0	0	2	4	0	0	100
	609	70	25	0	0	0	0	0	0	4	1	0	0	100
	Mean	**59.20**	**34.00**	**.00**	**.40**	**.00**	**.00**	**.00**	**.00**	**1.60**	**2.00**	**2.80**	**.00**	**100.00**
	StDev	**9.63**	**7.55**	**.00**	**.89**	**.00**	**.00**	**.00**	**.00**	**1.67**	**1.22**	**5.72**	**.00**	**.00**
Endocladia	610	53	40	0	2	0	0	0	0	1	4	0	0	100
	611	56	36	0	0	0	3	0	0	0	5	0	0	100
	612	11	0	0	0	0	84	0	0	4	1	0	0	100
	613	46	16	0	34	0	1	0	0	2	1	0	0	100
	614	10	0	0	1	0	87	0	0	2	0	0	0	100
	Mean	**35.20**	**18.40**	**.00**	**7.40**	**.00**	**35.00**	**.00**	**.00**	**1.80**	**2.20**	**.00**	**.00**	**100.00**
	StDev	**22.84**	**19.10**	**.00**	**14.89**	**.00**	**46.12**	**.00**	**.00**	**1.48**	**2.17**	**.00**	**.00**	**.00**
Rockweed	615	63	2	0	0	0	34	0	0	1	0	0	0	100
	616	81	14	0	0	0	0	0	0	3	2	0	0	100
	617	48	3	0	2	0	45	0	0	2	0	0	0	100
	618	66	11	0	11	0	3	0	0	7	2	0	0	100
	619	76	3	1	6	0	8	0	0	1	5	0	0	100
	Mean	**66.80**	**6.60**	**.20**	**3.80**	**.00**	**18.00**	**.00**	**.00**	**2.80**	**1.80**	**.00**	**.00**	**100.00**
	StDev	**12.79**	**5.50**	**.45**	**4.71**	**.00**	**20.21**	**.00**	**.00**	**2.49**	**2.05**	**.00**	**.00**	**.00**
Mussels	620	6	3	3	0	0	0	6	0	50	32	0	0	100
	621	5	0	7	0	0	0	11	0	41	36	0	0	100
	622	21	0	14	0	0	0	21	3	26	15	0	0	100
	623	28	0	13	0	0	0	20	4	23	12	0	0	100
	624	4	0	0	3	0	0	0	0	48	45	0	0	100
	Mean	**12.80**	**.60**	**7.40**	**.60**	**.00**	**.00**	**11.60**	**1.40**	**37.60**	**28.00**	**.00**	**.00**	**100.00**
	StDev	**10.99**	**1.34**	**6.11**	**1.34**	**.00**	**.00**	**9.02**	**1.95**	**12.46**	**14.09**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Fall 1999 (1/18/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	500	46	53	0	0	0	0	1	0	0	0	0	0	100
	501	56	44	0	0	0	0	0	0	0	0	0	0	100
	502	71	17	0	0	0	0	0	0	11	1	0	0	100
	503	32	37	0	27	0	0	0	0	0	4	0	0	100
	504	63	32	1	0	0	0	0	0	2	2	0	0	100
	Mean	**53.60**	**36.60**	**.20**	**5.40**	**.00**	**.00**	**.20**	**.00**	**2.60**	**1.40**	**.00**	**.00**	**100.00**
	StDev	**15.18**	**13.50**	**.45**	**12.07**	**.00**	**.00**	**.45**	**.00**	**4.77**	**1.67**	**.00**	**.00**	**.00**
Endocladia	505	54	1	0	11	0	0	26	0	3	5	0	0	100
	506	56	4	1	38	0	0	0	0	0	1	0	0	100
	507	32	1	0	45	0	0	12	0	8	2	0	0	100
	508	26	4	0	44	0	0	17	0	8	1	0	0	100
	509	42	4	0	38	0	0	5	0	11	0	0	0	100
	Mean	**42.00**	**2.80**	**.20**	**35.20**	**.00**	**.00**	**12.00**	**.00**	**6.00**	**1.80**	**.00**	**.00**	**100.00**
	StDev	**13.19**	**1.64**	**.45**	**13.92**	**.00**	**.00**	**10.17**	**.00**	**4.42**	**1.92**	**.00**	**.00**	**.00**
Mussels	510	7	0	0	0	0	0	2	0	10	81	0	0	100
	511	1	0	0	0	0	0	12	1	7	79	0	0	100
	512	16	5	0	0	0	0	60	7	10	2	0	0	100
	513	14	1	4	0	0	0	20	0	13	48	0	0	100
	514	10	0	0	1	0	0	2	0	21	66	0	0	100
	Mean	**9.60**	**1.20**	**.80**	**.20**	**.00**	**.00**	**19.20**	**1.60**	**12.20**	**55.20**	**.00**	**.00**	**100.00**
	StDev	**5.94**	**2.17**	**1.79**	**.45**	**.00**	**.00**	**24.02**	**3.05**	**5.36**	**32.52**	**.00**	**.00**	**.00**

Percent Cover of Index Species
NW Talcott, Santa Rosa Island - Fall 1999 (1/20/00)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	560	50	38	0	8	0	0	0	0	0	1	3	0	100
	561	49	37	0	5	0	2	0	0	5	0	2	0	100
	562	96	2	0	2	0	0	0	0	0	0	0	0	100
	563	24	2	0	0	0	73	0	0	1	0	0	0	100
	564	89	9	0	0	0	0	0	0	1	1	0	0	100
	Mean	**61.60**	**17.60**	**.00**	**3.00**	**.00**	**15.00**	**.00**	**.00**	**1.40**	**.40**	**1.00**	**.00**	**100.00**
	StDev	**30.17**	**18.39**	**.00**	**3.46**	**.00**	**32.43**	**.00**	**.00**	**2.07**	**.55**	**1.41**	**.00**	**.00**
Endocladia	555	14	0	0	53	0	33	0	0	0	0	0	0	100
	556	69	2	0	14	0	8	0	0	6	1	0	0	100
	557	9	0	0	14	0	68	0	0	9	0	0	0	100
	558	33	15	1	44	0	0	1	0	5	1	0	0	100
	559	72	2	0	3	0	0	0	0	21	2	0	0	100
	Mean	**39.40**	**3.80**	**.20**	**25.60**	**.00**	**21.80**	**.20**	**.00**	**8.20**	**.80**	**.00**	**.00**	**100.00**
	StDev	**29.79**	**6.34**	**.45**	**21.62**	**.00**	**29.16**	**.45**	**.00**	**7.85**	**.84**	**.00**	**.00**	**.00**
Rockweed	565	8	0	0	0	0	90	0	0	2	0	0	0	100
	566	10	1	0	0	0	85	0	0	4	0	0	0	100
	567	9	0	0	0	0	85	0	0	2	4	0	0	100
	568	37	0	0	27	0	36	0	0	0	0	0	0	100
	569	75	0	0	1	0	20	0	0	3	1	0	0	100
	Mean	**27.80**	**.20**	**.00**	**5.60**	**.00**	**63.20**	**.00**	**.00**	**2.20**	**1.00**	**.00**	**.00**	**100.00**
	StDev	**29.05**	**.45**	**.00**	**11.97**	**.00**	**32.69**	**.00**	**.00**	**1.48**	**1.73**	**.00**	**.00**	**.00**
Mussels	550	20	1	0	0	0	0	56	4	11	8	0	0	100
	551	14	0	1	0	0	0	61	0	18	6	0	0	100
	552	22	0	1	0	0	0	55	9	10	3	0	0	100
	553	31	0	4	0	0	0	20	6	39	0	0	0	100
	554	18	0	1	0	0	0	34	2	29	16	0	0	100
	Mean	**21.00**	**.20**	**1.40**	**.00**	**.00**	**.00**	**45.20**	**4.20**	**21.40**	**6.60**	**.00**	**.00**	**100.00**
	StDev	**6.32**	**.45**	**1.52**	**.00**	**.00**	**.00**	**17.48**	**3.49**	**12.42**	**6.07**	**.00**	**.00**	**.00**

Percent Cover of Index Species
Landing Cove, Santa Barbara Island - Fall 1999 (1/18/00)

Silvetia Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus		Mussels	Turf-weed	Pollicipes	Misc Algae	Misc Animal	Tar	Other	Total
Barnacle	315	70	11	14	3	0	0	1	0	0	0	1	0	0	100
	316	66	2	15	10	0	0	0	0	0	7	0	0	0	100
	317	57	1	31	4	0	0	2	0	0	5	0	0	0	100
	318	17	0	43	0	0	0	24	0	1	13	2	0	0	100
	319	72	28	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	**56.40**	**8.40**	**20.60**	**3.40**	**.00**	**.00**	**5.40**	**.00**	**.20**	**5.00**	**.60**	**.00**	**.00**	**100.00**
	StDev	**22.77**	**11.80**	**16.65**	**4.10**	**.00**	**.00**	**10.43**	**.00**	**.45**	**5.43**	**.89**	**.00**	**.00**	**.00**
Rockweed	310	33	2	0	0	0	19	13	0	0	32	1	0	0	100
	311	49	1	0	0	0	10	1	0	0	38	1	0	0	100
	312	33	0	0	0	0	14	0	0	0	52	1	0	0	100
	313	35	0	0	0	0	10	0	0	0	49	6	0	0	100
	314	37	1	0	0	0	14	1	0	0	46	1	0	0	100
	Mean	**37.40**	**.80**	**.00**	**.00**	**.00**	**13.40**	**3.00**	**.00**	**.00**	**43.40**	**2.00**	**.00**	**.00**	**100.00**
	StDev	**6.69**	**.84**	**.00**	**.00**	**.00**	**3.71**	**5.61**	**.00**	**.00**	**8.23**	**2.24**	**.00**	**.00**	**.00**
Mussels	325	1	0	1	0	0	0	85	0	2	4	7	0	0	100
	326	18	0	0	0	0	0	36	0	2	38	6	0	0	100
	327	3	0	0	0	0	0	72	0	4	17	4	0	0	100
	328	0	0	0	0	0	0	86	0	0	11	3	0	0	100
	329	8	0	0	0	0	0	89	0	0	1	2	0	0	100
	Mean	**6.00**	**.00**	**.20**	**.00**	**.00**	**.00**	**73.60**	**.00**	**1.60**	**14.20**	**4.40**	**.00**	**.00**	**100.00**
	StDev	**7.38**	**.00**	**.45**	**.00**	**.00**	**.00**	**22.01**	**.00**	**1.67**	**14.69**	**2.07**	**.00**	**.00**	**.00**
Red Algal Turf	320	3	0	0	0	0	0	0	90	0	6	1	0	0	100
	321	4	0	0	0	0	0	0	53	0	7	3	0	33	100
	322	1	0	0	0	0	0	1	17	0	10	1	0	70	100
	323	0	0	0	0	0	0	0	24	0	8	0	0	68	100
	324	0	0	0	0	0	0	0	79	0	21	0	0	0	100
	Mean	**1.60**	**.00**	**.00**	**.00**	**.00**	**.00**	**.20**	**52.60**	**.00**	**10.40**	**1.00**	**.00**	**34.20**	**100.00**
	StDev	**1.82**	**.00**	**.00**	**.00**	**.00**	**.00**	**.45**	**32.33**	**.00**	**6.11**	**1.22**	**.00**	**34.51**	**.00**

Appendix B. Photoplot Species Census

Presence of species within photoplots were noted.

X designates the species presence in that plot.

? indicates identification of that species was not positive.

Numbers indicate the actual number of that species found in the plot (species used in the mobile invertebrate count). At San Miguel Island (fall sampling), relative abundance is given as; R= rare, P= present, C= common, A= abundant, X = present but abundance ranking not given.

E indicates eggs of that species present.

Appendix C. General Species List

The species list contains presence/absence and relative abundance data for all species found at a site during the regular visit. Relative abundance values are subjective, relative to the entire site accounting for the appropriate habitat and based on observers' comparison to other areas. The time allotted to general species information gathering varied. Plot census observations were added to the general species list. When time and tide allowed, searches were made to include all the species that could be found on the rocky intertidal bench around a monitoring site. No general species list was collected for sites/dates not listed.

Abundance Ratings:
X - present, no relative abundance rating given
4 - abundant, organism present in higher than normal densities
3 - common, organism found over most of the site or in high density patches
2 - present, organism found in moderate numbers
1 - rare, few organisms found
0 - noticeably absent, an effort was made to look for an organism that was not found

Notes:
E eggs
D drift
S shell only

Appendix D. Trip Reports

The following are trip reports from 1998 field monitoring. These reports summarize the work done during each monitoring event, provide a quick summary of the data collected, and serve as metadata for those data.

San Miguel Island
March 16-21, 1999
(Database Event #1999A)

PERSONNEL: Derek Lerma, Biological Technician, Channel Islands National Park
David Kushner, Marine Biologist, Channel Islands National Park
Eric Hessell, Lab Assistant, Marine Science Institute, UCSB

PROCEDURE: Personnel departed Camarillo via Islander at 1045 and landed at San Miguel Island at approximately 1130. Three of the four permanent sites: Cuyler Harbor, Crook Point, and Otter Harbor were visited. Harris Point was not sampled due to pupping harbor seals at the site. At each monitored site photoplots were photographed, scored and censused for species. Limpets and abalone were measured and counted within permanent plots. Timed searches were performed at sites to enumerate sea stars, abalone and limpets when applicable. Physical observations, shorebird counts, and pinniped counts were done at each site. On March 17, 1999 the 19th Century shipwreck "Comet" was observed on a small beach just west of Simonton beach. The wreck was well exposed and several previously unobserved portions of the wreck were noted. Several of the island plants were in the process of blooming. Weather was overcast with occasional rain showers; winds never exceeded 15 mph. Transportation was delayed two days; departure to the mainland was on Sunday the 21st.

RESULTS:

March 16, 1999 Crook Point – Low tide –0.7 ft at 1509 hrs , Air temp. 17.5°C, Water temp. 12.5°C, Wind 15 NW, Surge moderate. One Double crested cormorant, two Brandt's cormorants and two Oystercatchers were observed at the monitoring site. Eleven weaner elephant seals occupied the small cove just east of the site.

Sampling began at 1330 with the help of Aaron Hebshi, seabird volunteer. The tide was still dropping and the reef was well exposed. The photoplots were scored and photographed. Species census was performed at all photoplots and relative abundance of additional species was noted throughout the site. Abalone plots were monitored and nine individuals were measured, four of which were less than 35 mm. Eight more abalone were located during a 30 minute search. The seastar *Pisaster ochraceus* was abundant, approximately 80% were small individuals. Eighty-six *Pisaster ochraceus* were counted in 30 minutes, slightly above average for this site. No limpets were monitored at this site and the temperature logger was not downloaded. An adult gray whale was observed in the kelp bed just offshore from the monitoring site. One commercial urchin boat was working at Wyckoff and other areas adjacent to the intertidal site. After sampling was completed we accompanied Aaron Hebshi to observe nesting cormorants. Approximately 246 Brandt's and six Pelagic Cormorants were counted nesting on the cliff about a quarter mile east of the intertidal monitoring site. A harbor seal pup was observed attempting to suckle an Elephant Seal weaner, near the cormorant nesting area.

Overall the area had a low diversity and abundance of macroalgae. *Hesperophycus californicus* was noticeably missing and *Silvetia compressa* was common but in poor shape, both observations are typical of this site. *Endocladia muricata* coverage remained consistent compared to previous years at about 20 %. *Ulva sp*. was common. Mussel plots had high coverage (73.8 %) and the majority of individuals were small. The

mussels in the mussel plots were often covered with *Ulva sp.* or *Porphyra sp.* making accurate percent cover estimates from slides extremely difficult. Leaf barnacles' *Pollicipes polymerus* were common in the lower intertidal. Evidence of abalone recruitment, several individuals less than 35mm, was encouraging and reaffirms the importance of continued monitoring of the black abalone plots.

Mean % cover for Photoplots at Crook Point, San Miguel Island (20 Plots)

Zone Name	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
Barnacle	62.0	32.0	1.8	0.0	0.0	3.2	1.0
Endocladia	52.2	4.2	22.4	1.4	6.6	8.6	4.6
Rockweed	44.8	14.6	11.6	8.6	9.4	9.0	2.0
Mussels	7.8	1.4	0.0	0.0	73.8	12.2	4.8

Black Abalone at Crook Point, San Miguel Island

Plot	Count	Mean Size	St Dev	Min Size	Max Size
1	3	83.33	58.00	25	141
4	6	60.33	39.21	24	124
6	8	78.75	8.41	70	90

Plot 6 = GS = 30-minute general search

Black Abalone percentage within size classes at Crook Point, San Miguel Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
1	3	33.33%	33.33%	33.33%	0.00%
4	6	50.00%	50.00%	0.00%	0.00%
6	8	0.00%	100.00%	0.00%	0.00%

March 17, 1999 Otter Harbor – Low tide –0.5 ft at 1542 hrs, Air temp. 16.5°C, Water temp. 12.0°C, Wind 8-10 W, and Surge light. Fifteen harbor seals and two pups occupied the site and twenty-four elephant seals and one harbor seal and pup resided on the small beach just east. Three Western gulls, one Oystercatcher and 10 Long-billed Curlews were counted on site. The reef just east of the sample site had 56 Willets and 3 Killdeer. Bird droppings initially looked to contain red crabs but on closer inspection the birds appear to have been feeding on another crustacean, possibly krill *Euphausia pacifica*.

Arrived on site at 1300 and conditions were excellent. All photoplots were scored, photographed and censused. Abalone plots were monitored and none were found. A 30-minute general search for abalone was conducted producing 50 individuals from 29mm –112 mm. An additional 25 abalone were observed, but not measured, after the 30 minute timed search. Nine black abalone measured less than or equal to 45mm, inferring some recent recruitment. Owl limpets *Lottia gigantea* were measured within two of the three abalone plots previously monitored for limpets. An apparent increase in small limpets (20mm – 29mm) was noted. *Pisaster ochraceus* were counted during a

30-minute search and 30 individuals were located, all large in size. The temperature unit was not downloaded at this site.

The algae at this site were abundant and diverse with rockweeds, *Hesperophycus californicus* and *Silvetia compressa,* present. *Ulva sp.* and red alga were lush and covered the attached invertebrates in several cases. Barnacle plots varied significantly in percent cover and several plots were dominated by *Ulva sp.* or misc. red algae. Barnacles were present, but in many cases covered by algae. *Endocladia muricata* was very healthy and dense with average cover near 54%, notably higher than the fall 1998 sampling (32%). *Hesperophycus californicus* was rare. Mussel, *Mytilus californianus*, in plots were consistently high in percent cover and little recruitment was evident. Percent cover of mussels was relatively unchanged from the fall 1998 sampling. All plots were in good shape and no repairs were required. This site has a diverse array of invertebrates including several species of limpets, chitons, and snails (See Species List).

Mean % cover for Photoplots at Otter Harbor, San Miguel Island (20 Plots)

Zone Name	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	21.6	17.4	0.0	0.0	0.0	58.0	0.2	2.8
Endocladia	7.0	0.6	53.2	19.8	0.8	17.0	1.6	0.0
Rockweed	15.4	9.0	24.6	33.6	0.0	16.2	1.0	0.2
Mussels	3.8	0.6	0.0	0.0	67.6	21.2	6.8	0.0

Black Abalone at Otter Harbor, San Miguel Island

Count	Mean Size	St Dev	Min Size	Max Size
50	73.44	23.02	29	112

Black Abalone percentage within size classes at Otter Harbor, San Miguel Island

Count	%<45mm	%45-126mm	%127-145mm	%>145mm
50	16.00%	84.00%	0.00%	0.00%

Owl Limpets at Otter Harbor, San Miguel Island

Plot	Count	Mean Size	St Dev	Min Size	Max Size
368	35	34.29	15.16	18	72
369	100	34.52	13.70	15	80

Owl Limpets percentage within size classes at Otter Harbor, San Miguel Island

Plot	Count	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%> 80mm
368	35	54.29%	8.57%	11.43%	11.43%	5.71%	2.86%	0.00%
369	100	30.00%	23.00%	15.00%	16.00%	2.00%	0.00%	1.00%

March 18, 1999 Cuyler Harbor – Low tide –0.3 ft at 1615 hrs, Air temp. 18.5°C, Water temp. 12.0°C, Mostly sunny, Wind 8-10 S, and Surge moderate. Four snowy plovers and 9 Willets were observed on the beach just north of the sample site along with 6 elephant seals. One Oystercatcher occupied the site on arrival. Sampling began relatively late (1545) due to the cancellation of sampling at Harris Point earlier in the day. Aaron Hebshi, seabird technician, joined us during sampling. Three people and a dog were contacted on Cuyler Beach. We notified them of the restrictions on bringing animals ashore within the park and spoke with them briefly regarding intertidal and subtidal sampling.

Photoplots were scored, photographed, and censused for species composition. There was a problem with the film and 10 of the photoplots and area photos were lost in developing. All plots were scored in the field, however. Macroalgae cover was lush throughout the site. *Silvetia compressa* and *Endocladia muricata* were abundant. *Hesperophycus californicus* was noticeably absent and *Ulva sp.* and *Porphyra sp.* were rare. Mussel beds contained a wide range of sizes with some recruitment evident. *Phragmatopoma californica* continues to dominate once primary abalone habitat. A 30-minute search for abalone was performed and none were found. Thirteen *Pisaster ochraceus* were counted in a subsequent 30-minute search. Both 30-minute searches were limited to the monitoring site. *Acanthina punctulata* and *Nucella spp.* were abundant. *Pachygrapsus crassipes* were uncommon relative to fall 1998 sampling.

Mean %cover for photoplots at Cuyler Harbor, San Miguel Island (20 Plots)

Zone Name	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
Barnacle	64.0	22.6	2.6	0.0	9.2	0.4	1.0
Endocladia	40.8	6.8	39.0	6.2	2.8	4.0	0.4
Rockweed	11.0	0.0	0.4	81.4	0.0	5.8	1.4
Mussels	28.8	8.4	0.6	0.0	42.4	5.0	14.8

March 18, 1999 Harris Point: Monitoring was cancelled due to the presence of Harbor seal pups. Harbor seal pupping is typically problematic with respect to intertidal access at his time of the year and luckily only Harris Point was not monitored because of possible disturbance.

March 19, 1999 Harris Point: Harbor seal pups were still present so monitoring this site was cancelled.

Anacapa Island
April 12-13, 1999
(Database event #1999B)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Kate Faulkner, Chief of Natural Resources Management, CINP
Gary Sullivan, Teacher, De Anza Middle School
Gary Buckenberger, Student, De Anza Middle School
Daniel Cruz, Student, De Anza Middle School

PROCEDURE: On 4/12, the Pacific Ranger arrived at Frenchy's Cove about 1100 hrs. Near the Cat Rock site, 17 harbor seals were encountered on two beaches. Five pups were present, but all were large and healthy. On 4/13, the Ocean Ranger dropped us off at 1000 before continuing on to East Anacapa and Santa Barbara Islands. We waited about an hour for the tide to drop, then worked at South Frenchy's Cove until 1500 hrs. Three owl limpet-monitoring plots were established at each site centered on aggregations of owl limpets. Plots were marked with a single stainless steel bolt and all limpets found within a one-meter radius were measured. The temperature logger was successfully downloaded from South Frenchy's Cove. All South Frenchy's Cove photoplots were scored in the field. Only 23 of 36 Cat Rock photoplots were scored in the field.

RESULTS: 12 April 1999, Cat Rock: low tide –0.2 ft at 1414 hrs, air temp 15°C, water 12.5°C, partly cloudy with morning fog, wind calm, surf 3 ft from the south making moderate surge. The site was worked from 1130-1515 hrs. Seven Black Oystercatchers and one Western Gull were at the site. A Rock Wren and Say's Phoebe were observed between Cat Rock and South Frenchy's Cove.

The red alga, *Porphyra perforata* was abundant growing over the tops of most of the rocks. Other red algae were lush and the diversity seemed high. Rockweeds were lush and abundant. *Hesperophycus californica* was common among the barnacle plots. *Sargassum muticum* was common in tidepools between Cat Rock and South Frenchy's Cove. Numerous *Ceratostoma nuttalli* were present under overhanging rocks at the site. Both *Tegula gallina* and *T. funebralis* were present. No seastars or abalone were found at the site. A 30-minute search was conducted for both abalone and seastars. The students measuring owl limpets encountered minor problems with species identification and recording but these were corrected. Film or camera problems resulted in the loss of nine photoplots slides (7 barnacle, 2 rockweed) on the roll continued from San Miguel Island. All lost plots were fortunately scored in the field.

Endocladia cover declined from a mean of 42% in spring 1997 and 31% in spring 1998 to just under 30 % in 1999. Barnacle, rockweed, and mussel cover all declined by 2-3% from 1997.

Photoplot summary- mean percent cover at Cat Rock (nine plots in each zone)

Zone	Bare Rock	Barnacle	Tetra clita	Endo cladia	Hespero phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	31.2	25.9	0.0	7.2	23.2	3.4	0.0	0.0	8.1	0.9	0.0
Endocladia	16.6	4.3	4.0	29.6	0.7	1.9	1.1	0.0	39.1	2.7	0.1
Rockweed	16.6	9.6	0.9	10.1	7.9	40.4	0.3	0.0	13.6	0.6	0.1
Mussels	24.9	4.6	10.8	0.0	0.0	0.0	29.9	0.3	26.0	3.6	0.0

Owl limpets in fixed plots at Cat Rock

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
1	26	31.08	7.84	15	43	8.278
2	33	39.70	7.97	23	61	10.506
3	8	46.88	11.01	31	63	2.547
total	**67**	**37.21**	**9.81**	**15**	**63**	**7.110**

Owl limpet size distributions in fixed plots at Cat Rock

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
1	7.69%	26.92%	50.00%	15.38%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	0.00%	6.06%	45.45%	33.33%	12.12%	3.03%	0.00%	0.00%	0.00%	0.00%
3	0.00%	0.00%	25.00%	37.50%	25.00%	12.50%	0.00%	0.00%	0.00%	0.00%
total	**2.99%**	**13.43%**	**44.78%**	**26.87%**	**8.96%**	**2.99%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

13 April 1999, **South Frenchy's Cove**: low tide –0.2 at 1448 hrs, air temp 17°C, water 12°C, morning fog with afternoon clearing, calm conditions, light surge with 2-3 ft swell. The site was worked from 1100 to 1500 hrs. A dead sea lion pup was on the upper rocks at South Frenchy's. A dead western gull and brown pelican were observed on the beach at North Frenchy's. An injured western gull was the only bird present.

Algae were lush, as they were at Cat Rock with *Porphyra perforata, Plocamium cartilagineum* and *Mazzaella leptorhynchos* being especially common. *Jania* sp. and *Lithothrix aspergillum* were common, both these species are somewhat unusual except at this site. A small colony of *Spheciospongia confoederata* was noted next to the site. This is an unusual find at Anacapa. Sandcastle worms, *Phragmatopoma californica,* were common at both South Frenchy's Cove and Cat Rock. No black abalone were observed. Two *Pisaster ochraceus* were found on the outer reef. Some *Acanthina* sp. and *Nucella emarginata* were found, small littorines were common, but other gastropods were generally rare.

Mussel cover was down from 72% in spring 1997. Endocladia cover was down from 62% in spring 1997. Barnacles and rockweed were each down only slightly from 1997 levels.

Photoplot summary- mean percent cover at South Frenchy's Cove (20 plots total)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
SFC	Barnacle	41.4	36.8	12.2	0.0	0.0	6.4	2.4	0.8
SFC	Endocladia	22.2	1.4	44.8	16.0	0.0	14.6	0.4	0.6
SFC	Rockweed	10.8	2.4	1.8	57.0	0.0	27.0	1.0	0.0
SFC	Mussels	3.4	0.8	1.0	0.0	47.8	38.4	8.6	0.0

Owl limpets in fixed plots at South Frenchy's Cove

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
1	13	46.31	10.31	22	61	4.139
2	23	38.61	7.74	28	56	7.323
3	8	49.75	2.76	46	53	2.547
total	**44**	**42.91**	**9.15**	**22**	**61**	**4.669**

Owl limpet size distributions in fixed plots at South Frenchy's Cove

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
1	0.00%	7.69%	7.69%	46.15%	30.77%	7.69%	0.00%	0.00%	0.00%	0.00%
2	0.00%	8.70%	47.83%	34.78%	8.70%	0.00%	0.00%	0.00%	0.00%	0.00%
3	0.00%	0.00%	0.00%	37.50%	62.50%	0.00%	0.00%	0.00%	0.00%	0.00%
total	**0.00%**	**6.82%**	**27.27%**	**38.64%**	**25.00%**	**2.27%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Santa Rosa Island
April 14-19, 1999
(Database event #1999C)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Chantal Collier, California State University, Northridge
Sarah Fangman, Channel Islands National Marine Sanctuary

PROCEDURE: The Ocean Ranger arrived at Santa Rosa Island about 1100 hrs. All five sites were visited, photoplots, limpet plots, abalone plots were all monitored according to the handbook. Photoplots were field scored at Ford Point, Fossil Reef and Northwest-Talcott. The three temperature loggers were all downloaded. All plots at all sites were logged with digital GPS. Plot corner repairs were made at all sites. Johnson's Lee site was visited on both 4/17 and 4/19 to complete the monitoring. On the afternoons of 4/17-18, drifter buoys were retrieved from Cluster Point beach for researchers at Scripps Institute of Oceanography. The roads on the island showed impacts from this month's rain and were rough, however the only problem spot encountered was above Quemada Canyon where one side of the road was washed out.

RESULTS:
14 April 1999, Ford Point: low tide –0.2 ft at 1531 hrs, air temp 15°C water 12.5°C, conditions were good with mostly clear skies, light NW breeze and light surge with 2-3 ft surf. On site from 1400-1700 hrs. No pinnipeds were present, two Black Oystercatchers were on the rocks to the west of the site.

Owl limpets seemed healthy and numerous. Plot counts were nearly identical to last January's except for a drop in plot 604. Juvenile limpets of undetermined species were abundant. Algae were lush and diverse. Sandcastle worms were abundant on the lower reef flat. Six black abalone were found during a 30-minute search and two later, ranging in size from 49 to 110 mm. This was one less than the January count. During a 30-minute search, 69 ochre stars were found. The seastar count was done late in the tide, which may explain part of the difference from the count in January, when 111 ochre stars were counted. All but two abalone plot corner bolts were found for accurate GPS mapping.

Photoplot summary- mean percent cover by zone at Ford Point, Santa Rosa Island

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
FP	Barnacle	67.4	23.0	3.8	0.0	0.0	1.6	4.2
FP	Endocladia	40.2	1.2	42.6	0.0	4.4	10.2	1.4
FP	Mussels	25.8	0.6	0.4	0.0	49.6	21.6	2.0

Owl Limpets in fixed plots at Ford Point

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
600	11	58.64	15.90	22	77	3.502
601	32	56.56	9.04	22	68	10.188
602	34	63.53	20.04	23	95	10.825
603	31	57.29	21.48	17	87	9.869
604	18	48.56	24.13	20	81	5.731
total	**126**	**57.66**	**18.93**	**17**	**95**	**8.023**

Owl limpet size distributions in fixed plots at Ford Point

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
600	0.00%	9.09%	9.09%	0.00%	9.09%	54.55%	18.18%	0.00%	0.00%	0.00%
601	0.00%	3.13%	3.13%	3.13%	53.13%	37.50%	0.00%	0.00%	0.00%	0.00%
602	0.00%	8.82%	5.88%	5.88%	14.71%	23.53%	20.59%	11.76%	8.82%	0.00%
603	3.23%	9.68%	16.13%	6.45%	6.45%	19.35%	25.81%	12.90%	0.00%	0.00%
604	0.00%	38.89%	5.56%	5.56%	5.56%	11.11%	27.78%	5.56%	0.00%	0.00%
total	**0.79%**	**11.90%**	**7.94%**	**4.76%**	**20.63%**	**26.98%**	**17.46%**	**7.14%**	**2.38%**	**0.00%**

15 April 1999, Fossil Reef: low tide 0.0 ft at 1608, air 17°C, water 13°C, conditions were excellent with calm wind, light surge, and fog over the water. On site from 1230-1800 hrs. Two black oystercatchers, three western gulls, six harbor seals and four elephant seal weaners were present. One sickly harbor seal pup was sleeping with the elephant seals and one harbor seal pup carcass was on the cobble beach. More elephant seals were present to the west on the small beach and the long beach further west was packed with elephant seals. Part of the cliff in front of the monitoring site collapsed since last January.

Five new owl limpet plots were installed about 130 meters east of the cobble beach section of the site. Each has one stainless steel bolt marking the center for a one-meter radius plot. The plots are 4.4 to 9.1 m apart. The rock is sandstone with some minor relief. High densities and a broad range of sizes were found.

A 30-minute search was made for black abalone around the boulders on the west side of the site and 17 were found. Eight more black abalone were found to the east later. Two of those abalone appeared withered. One black abalone shell was found on the cobble beach.

A full 30-meter seastar transect was run (the transect is often shortened to 15 m because of heavy surf on the outer reef). A total of 39 ochre stars were counted, the majority were in the first 15 m.

The three lowest mussel plots are dominated by sandcastle worms and *Chondracanthus canaliculatus*. Mussels were most likely eaten by seastars, but have increased in cover over the last two years. *Endocladia muricata* is doing well over most of the site; however, *Silvetia compressa* dominates two of the Endocladia plots (612, 614) and barnacles dominate two (610, 611). Large robust plants of *P. compressa* are common but many

seem tattered, probably from large waves. The *P. compressa* here was in the worst condition of all the sites. A brown alga, presumably *Colpomenia bullosa* (a new species of note here, having a tall thallus like *Halosaccion* sp). was common on the reef flat.

Photoplot summary- mean percent cover by zone at Fossil Reef, Santa Rosa Island

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
FR	Barnacle	59.6	36.6	0.0	0.0	0.0	0.6	1.4	1.8
FR	Endocladia	34.6	18.4	6.2	36.0	0.2	2.4	2.0	0.2
FR	Rockweed	63.8	5.8	2.8	19.8	0.0	5.8	2.0	0.0
FR	Mussels	10.8	6.6	1.2	0.0	13.2	40.2	28.0	0.0

Owl Limpets in fixed plots at Fossil Reef

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
1	27	54.19	17.34	17	78	8.596
2	31	48.84	18.60	17	75	9.869
3	38	64.61	21.03	26	94	12.098
4	78	55.62	15.75	15	83	24.833
5	67	46.21	15.70	16	75	21.331
Total	**241**	**53.39**	**18.17**	**15**	**94**	**15.345**

Owl limpet size distributions in fixed plots at Fossil Reef

Plot	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
1	7.41%	7.41%	7.41%	3.70%	25.93%	29.63%	18.52%	0.00%	0.00%	0.00%
2	9.68%	12.90%	12.90%	12.90%	16.13%	16.13%	19.35%	0.00%	0.00%	0.00%
3	0.00%	7.89%	10.53%	10.53%	5.26%	15.79%	15.79%	26.32%	7.89%	0.00%
4	1.28%	8.97%	10.26%	3.85%	24.36%	37.18%	11.54%	2.56%	0.00%	0.00%
5	2.99%	19.40%	10.45%	11.94%	38.81%	13.43%	2.99%	0.00%	0.00%	0.00%
Total	**3.32%**	**12.03%**	**10.37%**	**8.30%**	**24.48%**	**23.65%**	**11.62%**	**4.98%**	**1.24%**	**0.00%**

Black abalone from 30-minute search at Fossil Reef

Count	MeanSize	StDev	MinSize	MaxSize
17	108.00	19.27	82	141

16 April 1999, Northwest-Talcott: low tide + 0.3 at 1642 hrs, air 23°C, water 14°C, conditions were excellent with both wind and swell very calm, mostly clear with increasing clouds in the afternoon. We were on site from 1200-1730, but most of the plots were submerged before 1300 hrs. There were 14 black oystercatchers and two western gulls, 13 harbor seals, including 5 pups, were present on the beach to the east. Both pelagic and Brandt's cormorants were on nests on the bluff to the east of the site and great blue herons were on nests in the jaw gulch area. There have been several small landslides along the bluff backing the intertidal since January.

Endocladia was common throughout the site. *Silvetia* looked healthy and was dense over its zone. *Phyllospadix* was abundant, much of it epiphytized by *Enteromorpha*. Two

black abalone were found during a 30-minute search (93 and 141 mm). Various nudibranchs, especially Hopkins' Rose were common. *Haminoea, Aplysia, Diadora* and juvenile monkeyface eels and pricklebacks were commonly found among the boulders. *Sargassum muticum* was common.

Photoplot summary- mean percent cover by zone at Northwest-Talcott, Santa Rosa Island

ZoneName	Rock	Barnacle	Tetraclita	Endocladia	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	45.4	15.4	0.0	1.4	11.4	0.0	0.0	24.8	0.6
Endocladia	32.8	0.2	0.0	29.2	22.2	1.0	0.0	14.6	0.0
Rockweed	28.8	0.0	0.0	5.6	59.2	0.0	0.0	6.0	0.4
Mussels	18.8	0.2	1.8	0.0	0.0	40.2	3.8	30.6	4.6

Owl Limpets in fixed plots at Northwest-Talcott

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
701	22	67.00	20.51	30	91	7.004
702	21	68.81	10.69	46	86	6.686
703	22	58.32	16.46	15	75	7.004
704	19	60.89	15.51	24	78	6.049
705	20	50.15	19.06	15	82	6.367
total	**104**	**61.17**	**17.80**	**15**	**91**	**6.622**

Owl limpet size distributions in fixed plots at Northwest-Talcott

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
701	0.00%	0.00%	9.09%	18.18%	9.09%	13.64%	4.55%	40.91%	4.55%	0.00%
702	0.00%	0.00%	0.00%	4.76%	9.52%	33.33%	33.33%	19.05%	0.00%	0.00%
703	9.09%	0.00%	4.55%	9.09%	9.09%	45.45%	22.73%	0.00%	0.00%	0.00%
704	0.00%	10.53%	0.00%	10.53%	10.53%	36.84%	31.58%	0.00%	0.00%	0.00%
705	15.00%	10.00%	0.00%	5.00%	35.00%	25.00%	5.00%	5.00%	0.00%	0.00%
total	**4.81%**	**3.85%**	**2.88%**	**9.62%**	**14.42%**	**30.77%**	**19.23%**	**13.46%**	**0.96%**	**0.00%**

17 April 1999, Johnson's Lee, low tide –0.9 ft at 0531 hrs, air 19°, water 13°C, conditions were clear and calm with a 2 ft surf. On site from 0730 to 0930. One Black Oystercatcher and six Black Turnstones were seen. We relocated plot 514 which was overgrown by sandcastle worms. This plot has been difficult to locate in the past so bolts were placed in three corners. A second bolt was added to each of plots 510 and 511 which have also been difficult to find at times.

There was little change in the owl limpet plots since January, though one plot did drop from 22 to 13. Small owl limpets were found, which seems encouraging. A search was made for abalone and seastars but the tide was already above the lower reef. The barnacle plot (504) that has been dominated by algae and owl limpets for some time is now dominated by *Balanus glandula*.

Photoplot summary- mean percent cover by zone at Johnson's Lee, Santa Rosa Island

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
JL	Barnacle	59.6	35.0	3.6	0.0	0.0	0.0	1.8
JL	Endocladia	47.8	5.0	32.4	0.0	13.2	0.4	1.2
JL	Mussels	9.2	1.8	0.0	0.0	20.8	24.0	44.2

Owl Limpets in fixed plots at Johnson's Lee

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
595	6	55.00	5.87	44	60	1.910
596	20	59.50	13.01	27	73	6.367
597	7	38.71	24.27	15	65	2.229
598	19	45.84	17.52	20	72	6.049
599	13	47.46	17.07	16	67	4.139
Total	**65**	**50.45**	**17.31**	**15**	**73**	**4.139**

Owl limpet size distributions in fixed plots at Johnson's Lee

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
595	0.00%	0.00%	0.00%	16.67%	66.67%	16.67%	0.00%	0.00%	0.00%	0.00%
596	0.00%	5.00%	5.00%	5.00%	20.00%	45.00%	20.00%	0.00%	0.00%	0.00%
597	42.86%	0.00%	14.29%	0.00%	0.00%	42.86%	0.00%	0.00%	0.00%	0.00%
598	0.00%	26.32%	5.26%	26.32%	10.53%	26.32%	5.26%	0.00%	0.00%	0.00%
599	15.38%	0.00%	15.38%	15.38%	30.77%	23.08%	0.00%	0.00%	0.00%	0.00%
Total	**7.69%**	**9.23%**	**7.69%**	**13.85%**	**21.54%**	**32.31%**	**7.69%**	**0.00%**	**0.00%**	**0.00%**

18 April 1999, East Point, low tide –0.9 at 0623 hrs, air 16°C, water 12.8°C, conditions excellent with clear, calm conditions and moderate surge of 3-4 ft surf. Only nine harbor seals were present at Abalone Rocks and at East Point only four Black Oystercatchers and later 25 Sanderlings were present. Old Ranch House Canyon Lagoon was closed and about mid-water level. Six mallards and four American coots were present.

One black abalone (129 mm) and 14 ochre stars were found in a 30-minute search. A species census was made of all the photoplots. *Silvetia compressa* and *Hesperophycus californica* were dense over the site. Young rockweed plants (probably *Hesperophycus*) were numerous in some of the Endocladia plots. *Endocladia* was abundant. A rich diversity of algae was found at the site. The outer edge of the mussel bed seems to have been pushed back and sandcastle worms now dominate the margin of the reef.

In the afternoon, we retrieved four oceanographic drifter buoys from Cluster Point and moved the remaining six to higher ground. Five were recovered yesterday.

Photoplot summary- mean percent cover by zone at East Point, Santa Rosa Island

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
EP	Barnacle	58.6	27.0	11.2	2.2	0.0	0.4	0.4	0.2
EP	Endocladia	15.6	3.2	65.4	15.8	0.0	0.0	0.0	0.0
EP	Rockweed	5.6	0.0	0.4	87.0	0.0	7.0	0.0	0.0
EP	Mussels	6.0	1.6	0.0	0.0	77.8	10.6	4.0	0.0

19 April 1999, Johnson's Lee: low tide –0.7 at 0721 hrs, air 14°C, water 13°C, conditions were calm and clear, surge moderate with 1-3 ft surf. On site from 0700 to 0830. There were no birds or pinnipeds present. We returned to the site to re-photograph the plots since the film was partially exposed when it did not rewind properly.

Seastars were common throughout the site and in the 10 m x 2 m transect, 31 ochre stars were counted. One black abalone (135 mm) was present within the seastar transect. Five owl limpets were collected for histological samples.

We flew back on the plane leaving at 1025.

Santa Cruz Island
April 23, 1999
(Database event #1999D)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park

PROCEDURE: Day trip on Pacific Ranger, overlapping with Prisoner's Harbor run for The Nature Conservancy. The 25 photoplots were photographed, scored in the field, and logged with the digital GPS. Video pans were shot from each of the three reference bolts. The day trip planned for 4/22 was canceled because of hazardous seas.

RESULTS: 4/23/99 Orizaba Cove, low tide –0.1 ft at 1207, conditions were good with hazy fog, 5 kts NW wind, 1-2 ft seas, moderate surge. We were on site from 1145-1415 hrs. Six harbor seals were on the rocks on the west side of the cove (across from the site) and 5 Black Turnstones and one Ruddy Turnstone were present.

This site has an amazing barnacle zone, both *Tetraclita rubescens* and *Balanus glandula* are large and dense. *Chthamalus fissus/dalli* is common. There appeared to be little of the sandcastle worm *Phragmatopoma californica*, except for one patch near the back of the cove. *Chondracanthus canaliculatus* and *Mastocarpus papillata* also only seemed to be in the back of the cove. A small patch of *Sargassum muticum* was noted.

Mussels were dense in the plots and overgrowing the plots. One juvenile black abalone (~40 mm) was found by the corner bolt of M1. *Ocenebra circumtexta* was common. *Nucella emarginata* was present in lower densities. *Silvetia compressa* was doing very well but *Hesperophycus californicus* was uncommon and almost absent from the Hesperophycus plots. There are no Endocladia zone plots but *Endocladia muricata* was common in the small cove just east of the site. Eight *Pisaster ochraceus* were counted along the edges of the site.

Photoplot summary- mean percent cover at Orizaba Cove

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
OC	Barnacle	49.4	43.8	1.2	0.0	0.8	3.2	1.6	0.0
OC	Rockweed	14.6	0.4	0.2	49.0	0.2	35.2	0.4	0.0
OC	Mussels	7.0	5.6	0.0	0.0	78.8	5.8	2.8	0.0
OC	Tetraclita	45.6	31.8	0.0	0.4	4.8	14.2	3.2	0.0
OC	Hesperophycus	40.8	9.2	13.2	10.4	0.4	24.6	1.4	0.0

Santa Cruz Island
May 17-21, 1999
(Database event 1999E)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
David Kushner, Marine Biologist, Channel Islands National Park

PROCEDURE: A number of different parties and a large amount of gear were delivered to Prisoner's Harbor via the OCEAN RANGER on 5/17. We spent two nights camping at the west end trailer while completing the monitoring at the two sites there, then spent two nights at the UC research station. The sites were monitored according to the standard NPS protocol and the handbook for Santa Cruz Island. All photoplots were scored in the field and censused for species present. Video documentation was made for each site.

RESULTS: One of the other parties on the island was a group of geologists from USGS who had come out to collect tar samples from the beaches around the island for "fingerprinting". Once everyone had checked into the research station, we showed the USGS folks the way to Christy beach and we all walked the beach to collect tar or count shore birds. For the entire beach, we found 3 common raven, 7 killdeer, and 25 western gulls. There was a single black oystercatcher on rocks to the south of the beach and 12 surf scoters offshore. Tar blobs up to about 20 cm in diameter were common along the upper beach. Giant Reed, *Arundo donax*, was growing in the southern drainage with about 12 total living stalks. We broke the stalks when we could not pull them out. Kelp wrack was common. There was surprisingly little debris; mostly straws, bottle caps, glass bottles, floats and a single lobster trap. Kelp flies and beach hoppers were common. Krill, *Euphausia* sp. were washing up on the sand at the north end. Those of us with grass allergies were suffering terribly.

Trailer site: 5/18/1999 low tide –1.1 ft at 0702 hrs, air temp 14° C, water temp 13.5° C, there was a light morning fog, wind and waves were calm and the surf was light at 1-2 ft. No shorebirds or pinnipeds were present on shore. One harbor seal pup watched us from offshore later and one black oystercatcher and one wandering tattler were observed in the afternoon. The monitoring was conducted from 0645 to 1030 hrs.

All plots were easily found and no repairs were necessary. Kushner conducted a 30-minute abalone search over the monitoring reef and found five black abalone (65-120 mm) and three ochre stars. He later searched about 20-minutes covering the reef to the south and found an additional four black abalone (60-135 mm) and 2 ochre stars. Both *Hesperophycus* and *Silvetia* were well represented in their zones. There were young plants of both species coming up around the reef. Numerous *Lepidochitona hartwegii* were present under the rockweed canopy. Juvenile California mussels were common, though most plots had less than 50% mussel cover. *Endocladia* was fairly common but usually mixed with other species here. *Porphyra perforata* was abundant, covering much of the mid- to upper zones. *Egregia menziesii* was abundant in the lower intertidal. The canopy of the giant kelp beds offshore along this stretch of coast was very thick. *Tegula funebralis* was common. *T. gallina* was present in low numbers. *Lottia asmi* was common here and often large. Giant owl limpets, *Lottia gigantea*, seemed to be present in good numbers and were some of the largest we measured all week. The total found in the plots (161) was less than the total in December 1998 (227), mean size was the same

however. The surf grass transects were comparable to last December with surfgrass cover at 77%, 62% and 74% in the three transects.

Photoplot summary- mean percent cover by zone at Trailer, Santa Cruz Island (20 plots)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
TR	Barnacle	51.8	37.2	7.8	0.0	0.2	1.4	1.6	0.0
TR	Silvetia	10.6	0.8	2.2	83.0	0.0	3.4	0.0	0.0
TR	Mussels	17.0	2.0	0.6	0.0	45.6	21.4	13.4	0.0
TR	Hespero-phycus	53.2	3.0	9.6	29.2	0.0	4.6	0.4	0.0

Owl limpets in fixed plots at Trailer site

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
1	36	61.28	21.60	23	87	11.461
2	43	55.21	18.01	17	87	13.690
3	19	42.68	19.65	15	69	6.049
4	50	49.46	13.72	16	73	15.918
5	13	49.77	22.15	15	78	4.139
total	**161**	**52.86**	**18.95**	**15**	**87**	**10.252**

Owl limpet size distributions in fixed plots at Trailer site

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
1	0.00%	13.89%	11.11%	5.56%	2.78%	25.00%	13.89%	27.78%	0.00%	0.00%
2	2.33%	4.65%	16.28%	11.63%	18.60%	18.60%	23.26%	4.65%	0.00%	0.00%
3	26.32%	5.26%	5.26%	15.79%	21.05%	26.32%	0.00%	0.00%	0.00%	0.00%
4	4.00%	8.00%	10.00%	18.00%	30.00%	28.00%	2.00%	0.00%	0.00%	0.00%
5	7.69%	15.38%	15.38%	15.38%	7.69%	0.00%	38.46%	0.00%	0.00%	0.00%
total	**5.59%**	**8.70%**	**11.80%**	**13.04%**	**18.01%**	**22.36%**	**13.04%**	**7.45%**	**0.00%**	**0.00%**

Fraser Cove: 5/19/1999, low tide –0.8 ft at 0803, there was a heavy morning fog and winds of 15 kts from the NW. The surge was moderate with a 3 ft wave. Shredded *Macrocystis* pieces were all over the reef. No birds were present when we arrived at Fraser, but two hybrid American-Black Oystercatchers arrived shortly after. At Forney's Cove there were 52 gulls (unid.) and 1 Black Oystercatcher at the site when we arrived. Monitoring was conducted between 0645 and 1215.

All the plots were easily found. One repair was made to the start of G1. The bolt was in place, but loose. The surfgrass transects were comparable to last December, the percent cover of surfgrass was 43%, 64 % and 79% in the three transects. *Porphyra perforata* was abundant and covered much of the mid to upper intertidal. The dense cover of *Porphyra perforata* made it difficult to find owl limpets in the plots but careful searches were made. Owl limpets were only measured within a one-meter radius for each plot to be comparable to other sites rather than the 1.5-m radius originally done at

this site. The totals from the one-meter radius were lower this sample (82) than in December 1998 (139).

Silvetia compressa and *Hesperophycus californicus* were both very lush at the rockweed plots on the Forneys Cove side. Juvenile rockweed plants were coming up in the Endocladia plots. *Endocladia* at Fraser Cove is very dense resulting in a low diversity of species in those plots. Acorn barnacles were abundant with *Chthamalus* being most abundant. *Porphyra perforata* was present in all the tar plots as well as most others. The mussel plots were scored for primary cover (ignoring the *Porphyra* over the mussels), however the other plots were scored as if from slides looking at the *Porphyra*. Colonial *Anthopleura elegantissima* was common in the mussel plots.

Photoplot summary- mean percent cover by zone at Fraser Cove, Santa Cruz Island (35 plots)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
FC	Barnacle	14.8	6.8	18.8	0.0	0.0	59.2	0.4	0.0
FC	Endocladia	17.6	0.6	70.4	0.4	0.0	10.2	0.8	0.0
FC	Rockweed	16.6	1.0	4.6	69.6	0.0	7.0	1.2	0.0
FC	Mussels	12.6	0.2	0.0	0.0	62.0	7.6	17.6	0.0
FC	Pollicipes	16.4	2.6	0.6	0.0	40.4	13.0	27.0	0.0
FC	Tar	21.5	7.3	1.2	0.3	0.0	36.7	0.0	33.0
FC	Hespero-phycus	49.5	7.8	12.8	12.8	0.0	16.8	0.5	0.0

Owl limpets in fixed plots at Fraser Cove

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
1	10	51.60	16.37	19	78	3.184
2	12	49.75	14.80	17	66	3.820
3	19	34.37	9.27	15	52	6.049
4	18	34.39	10.49	19	53	5.731
5	24	43.96	11.22	19	60	7.641
total	**83**	**41.45**	**13.52**	**15**	**78**	**5.285**

Owl limpet size distributions in fixed plots at Fraser Cove

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
1	10.00%	0.00%	10.00%	30.00%	10.00%	30.00%	10.00%	0.00%	0.00%	0.00%
2	8.33%	0.00%	16.67%	8.33%	33.33%	33.33%	0.00%	0.00%	0.00%	0.00%
3	10.53%	21.05%	36.84%	26.32%	5.26%	0.00%	0.00%	0.00%	0.00%	0.00%
4	5.56%	27.78%	27.78%	33.33%	5.56%	0.00%	0.00%	0.00%	0.00%	0.00%
5	4.17%	4.17%	29.17%	25.00%	33.33%	4.17%	0.00%	0.00%	0.00%	0.00%
total	**7.23%**	**12.05%**	**26.51%**	**25.30%**	**18.07%**	**9.64%**	**1.20%**	**0.00%**	**0.00%**	**0.00%**

Willows Anchorage: 5/20/1999, low tide –0.5 ft at 0909, air temp 15° C, water temp 13° C. There was morning fog with winds about 5-10 kts from the west; the sea was calm but occasional sets of swell would cover the reef even at low tide. There were no vertebrates

on the reef but a harbor seal watched us from offshore and two Black Oystercatchers chased a raven overhead. The site was monitored from 0745-1115 hrs.

Kushner conducted a 30-minute search and found two black abalone (90, 92 mm). A total of 27 ochre stars were found in 30 minutes. Only six seastars were found in December. Seastar arm-lengths were measured after with a range of 44-160 mm. Sandcastle worms, *Phragmatopoma californica*, were common on the inner reef. The brown alga, *Colpomenia* sp. was very dense in patches on the inner reef and was common on the beach in the swash line. *Sargassum muticum* was fairly common. Several of the higher rockweed plots had little rockweed and He1 (the highest *Hesperophycus* plot) had few live organisms. This plot is apparently buried by sand at times. *Endocladia* and misc. algae cover decreased since December 1998. On the outer reef, mussel cover was fairly high but nearly all the mussels were small (<40 mm). Mussel cover increased from about 20% to 34% between December and May. The snail *Nucella emarginata* seemed especially common here in the mussel beds, with 26 found in one plot. The number and size of owl limpets was very similar to the December sample.

Photoplot summary- mean percent cover by zone at Willows Anchorage, Santa Cruz Island (20 plots)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
WA	Endocladia	72.2	3.4	20.2	0.0	0.0	0.2	4.0	0.0
WA	Rockweed	32.4	1.6	8.4	45.2	0.0	7.6	4.8	0.0
WA	Mussels	15.2	5.6	1.0	0.0	33.8	29.0	15.4	0.0
WA	Hespero-phycus	53.0	4.8	4.8	27.2	0.0	9.2	1.0	0.0

Owl limpets in fixed plots at Willows Anchorage

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
1	37	20.95	8.94	15	54	11.780
2	12	21.50	9.22	15	44	3.820
3	37	23.46	8.57	15	44	11.780
4	39	23.10	11.07	15	62	12.416
5	17	26.18	9.24	18	50	5.412
total	**142**	**22.87**	**9.54**	**15**	**62**	**9.042**

Owl limpet size distributions in fixed plots at Willows Anchorage

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
1	64.86%	24.32%	2.70%	5.41%	2.70%	0.00%	0.00%	0.00%	0.00%	0.00%
2	66.67%	16.67%	8.33%	8.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	51.35%	21.62%	21.62%	5.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4	58.97%	20.51%	10.26%	5.13%	2.56%	2.56%	0.00%	0.00%	0.00%	0.00%
5	17.65%	58.82%	11.76%	5.88%	5.88%	0.00%	0.00%	0.00%	0.00%	0.00%
total	**54.23%**	**26.06%**	**11.27%**	**5.63%**	**2.11%**	**0.70%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Prisoner's Harbor: 5/21/1999, low tide -0.2 ft at 1016 hrs, conditions were overcast and calm with virtually no surf. The monitoring was done between 0830 and 1110. There was one female Ruddy(?) Duck on the rocks when we arrived. Two Black Oystercatchers flew over us and one harbor seal watched us from the water.

All the plots were easily found except B1, which was partially buried by cobble. The whole reef was searched in 15 minutes and two ochre stars were found, but no abalone. Horse mussels, *Septifer/Brachidontes*, and smooth chitons *Lepidochitona hartwegii* were common in many of the plots. *Endocladia* was common in both the *Endocladia* and *Hesperophycus* plots and showed a large increase since December. Acorn barnacles, mostly *Chthamalus* seemed abundant in the *Hesperophycus* and *Endocladia* plots. *Hesperophycus* cover was much higher than in December. The snails, *Nucella emarginata*, *Acanthina spirata* and *Ocenebra circumtexta* were all fairly common.

The OCEAN RANGER arrived about 1120 to take us back to Ventura.

Photoplot summary- mean percent cover by zone at Prisoner's Harbor, Santa Cruz Island (25 plots)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
PH	Barnacle	47.8	14.0	17.4	12.0	0.4	6.2	2.2	0.0
PH	Endocladia	20.0	15.4	59.0	0.8	0.4	4.0	0.4	0.0
PH	Rockweed	1.4	0.2	0.0	92.0	0.0	6.0	0.4	0.0
PH	Mussels	7.4	1.6	0.0	0.0	59.2	21.8	10.0	0.0
PH	Hespero-phycus	38.0	24.2	25.8	8.4	0.0	1.4	2.2	0.0

Santa Cruz Island
June 1, 1999
(Database event 1999-F)

PERSONNEL:Dan Richards, Marine Biologist, Channel Islands National Park

PROCEDURE: Took the Ocean Ranger out on 5/31 to spend night at Scorpion Anchorage. Kayaked over to monitoring site at dawn for the early tide. Conducted the monitoring following standard protocol and returned to Ventura in the afternoon aboard the Surf Ranger on 6/1.

RESULTS: Scorpion Rock, low tide –0.3 ft at 0603 hrs, air temp 20° C, water temp 16°C, partly cloudy and calm conditions. There was no swell. Clouds built up during the day and some rain fell on Ventura in the evening. The monitoring was conducted between 0600-1000 hrs. At the main site there were two Western Gulls and one Brown Pelican. On the reef between the *Hesperophycus* plots and Scorpion Rock there were two black oystercatchers and one harbor seal. At least four pair of pigeon guillemots were present in the Scorpion/Little Scorpion Anchorage areas.

The plots were all readily found. Some of the bolts in the mussel plots are difficult to find because of the depth of the mussel bed however. The mussel beds appeared to be healthy and were quite dense. Red thatched barnacles were present in all the *Tetraclita* zone plots, most were alive and though there were a few empty tests. *Hesperophycus californicus* was lush in that zone, *Silvetia compressa* was present but *Hesperophycus* was the most abundant. Cobble covered the lower corner of Hesperophycus plot 4, and several of the bolts are bent over in this area. *Chthamalus* were common and obtain a large size here making them easily mistaken for *Balanus glandula*, which were also present. *Endocladia* was present in sparse small clumps in the *Endocladia* zone plots, but was common around the Hesperophycus zone plots. *Littorina* spp. and *Ocenebra circumtexta* were present in good numbers. *Nucella emarginata, Acanthina* sp*., Ceratostoma nutalli, Tegula funebralis* and *T. gallina* were present in low numbers. One ochre star was seen on the larger reef of Scorpion Rock. Euphusids were washing up on the beach at Scorpion Anchorage.

Anacapa Island
October 24-26th, 1999
Database event 1999-G (#9907)

PERSONNEL: Derek Lerma, Biological Technician, Channel Islands National Park
Barbara Hajduczek, VIP, Channel Islands National Park

PROCEDURE: Traveled out to Frenchy's Cove via Island Packers. On 10/24 we departed Channel Islands Harbor at 0830 for the east end of Anacapa to drop off day passengers. We observed two sub-adult blue whales approximately 2 to 3 miles north east of the arch. The SUNFISH then proceeded to Frenchy's Cove to drop off day kayakers and Barbara and I. The Sunfish did not have a skiff so we kayaked everything ashore. Conditions were excellent with light winds and 1-2 ft surf. On arrival we set up camp at the old ranger site atop the ridge and contacted a squid light boat captain enjoying the day ashore reading a book. Barbara and I snorkeled in and around Frenchy's cove moving west, juvenile bat rays were abundant and juvenile olive rockfish, pile perch, and black surfperch were common. Lobster were increasingly common moving west. Seven squid light boats, two sailboats, and four powerboats were anchored in and around Frenchy's at approximately 2:00pm. Thirty plus sport fishing boats were visible on the south side, east of Cat Rock.

RESULTS: 10/24/99, South Frenchy's Cove, low tide –0.3 @ 1612, conditions were hot and calm, air temperature 25.5°C, water temperature 17.5°C, surge light, sky mostly clear with some high clouds, wind 8-10 mph NW, and wave height 2 ft. One western gull and one harbor seal were observed at the site.

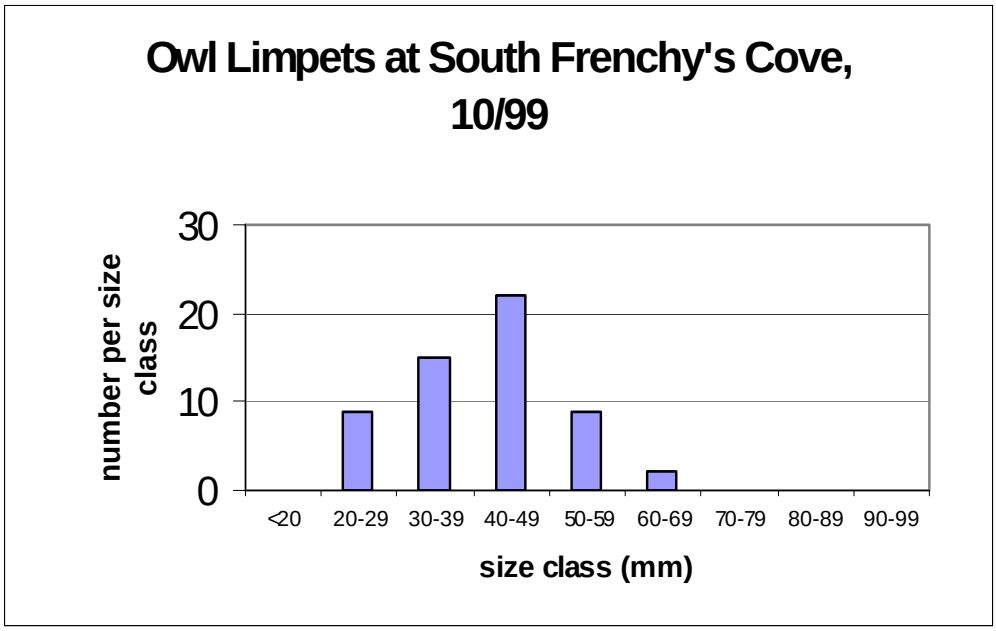
Began sampling at 1400 locating and scoring photoplots. Sand height in the surge channels was relatively high measuring just 40 cm to the top right corner of plot 155. Barbara started scoring barnacle plots while I photographed and located additional plots. We double-checked her scoring and alignment for the first few and then I took over to continue scoring the remainder of the plots as she began measuring limpets in plots. All photo plots were located and appeared in good condition. Barnacle plots had consistent numbers throughout all barnacle plots, Endocladia and Rockweed plots varied markedly and *Hesperophycus californicus* and *Silvetia compressa* were both present with the former in much lower densities. Mussel plots were dominated by a combination of *Mytilus californianus* and miscellaneous algae, typical for the site.

Checked Barbara's limpet identification after 10 minutes discounting several animals not *Lottia gigantea*. *Lottia sp.* numbers were slightly higher than last spring, Fall N = 57 versus Spring N = 44, but size class distribution appeared unchanged. No abalone and one ochre star, *Pisaster ochraceus,* were observed during a 30-minute search of the site. No species census in plots was performed. Photos of surge channels, limpet plots, and the general area were taken. The optic stowaway temperature unit was downloaded successfully.

Overall seabirds were rare as well as marine mammals. Most tidepools contained several opaleye and sculpins. *Sargassum muticum* was rare with no plants in large upper pools. Rockweeds varied in density but appeared lush overall.

Photoplot summary – mean % cover by zone at South Frenchy's Cove (20 plots)

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	46.4	31.4	13.2	0.0	0.0	1.6	5.8	1.6
Endocladia	21.2	1.2	59.2	14.8	0.0	1.8	1.0	0.8
Rockweed	21.0	2.2	5.0	66.0	0.0	5.6	0.2	0.0
Mussels	8.6	0.2	0.6	0.0	50.2	36.8	3.6	0.0



10/25/99, Cat Rock, low tide –0.5 @ 1657, conditions were warm and sunny, air temperature 21°C, water temperature 17°C, surge light, wind 10-12 mph WNW, waves 1-2 ft. One western gull, one wandering tattler, and one Brandt's cormorant was observed between South Frenchy's Cove and Cat Rock.

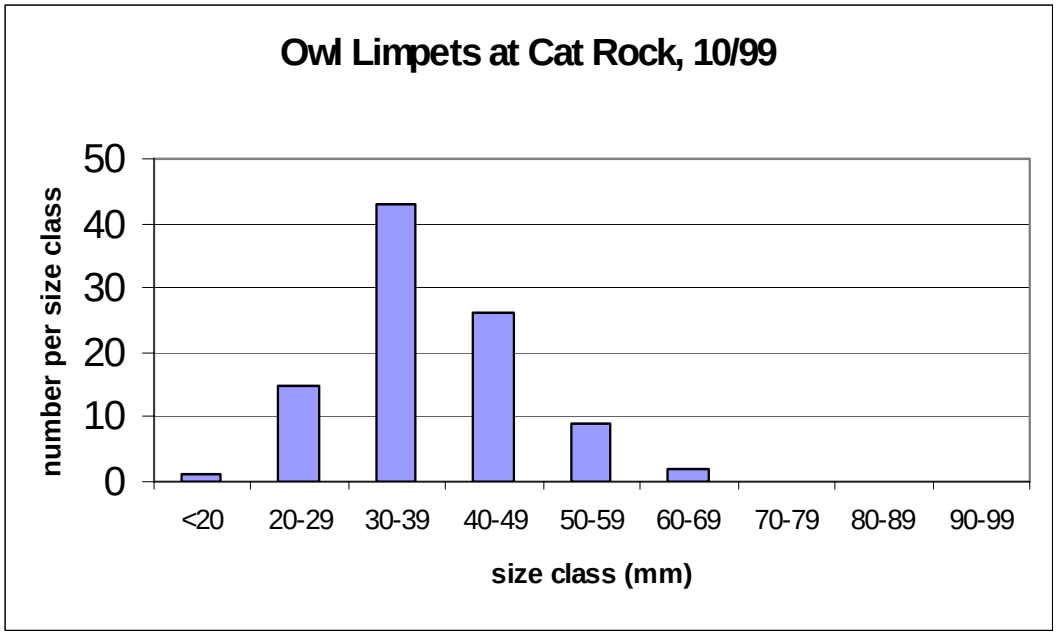
Wind increased overnight to 15 mph from the WNW and seven squid light boats and 5 squid seiners worked the area just off Frenchy's cove and west towards the Pelican closure area. Arrived on sight at 1330 with the tide dropping quickly. Barbara began scoring plots while I located and photographed additional plots. Barnacle and Endocladia plots appeared healthy with a few exceptions where misc. algae or rockweed dominated. Rockweed appeared robust and abundant throughout the site. *Hesperophycus californicus* and *Silvetia compressa* were present in similar densities. Mussel plots varied from mussel dominated to mostly *Tetraclita rubescens* and misc. algae. Surge channels contained *Cystoseira sp*., *Eisenia arborea*, *Egregia menziesii*, and *Prionitis sp.. Sargassum muticum* was noted near limpet plot number three. Several small *Lottia sp*. were present in plots L1 and L2. No abalone or sea stars were observed at this site. One harbor seal appeared in the water adjacent to the site. Several Opaleye and Sculpins were noted in the tidepools.

All plots were scored in the field but no species census was performed due to lack of time. Returned to camp about 1830 with squid light boats working the same area as the day before. After dinner I walked intertidal areas in search of rats. Several rats were

seen on trails and near camp but none in the intertidal. Snorkeled, just west of Frenchy's Cove, the following day prior to departure and collected two fresh green abalone shells approximately 42 and 65 mm.

Photoplot summary – mean % cover by zone at Car Rock (9 plots per zone)

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	25.1	20.2	10.0	38.4	0.0	4.9	1.3	0.0
Endocladia	21.0	12.0	31.8	5.2	1.8	22.6	5.7	0.0
Rockweed	16.3	9.1	7.4	59.1	0.3	5.7	2.0	0.0
Mussels	17.2	16.1	2.0	0.0	31.1	27.7	5.9	0.0



Anacapa Island
November 23, 1999
Database event 1999-H (#9909)

PERSONNEL: Derek Lerma, Biological Technician, Channel Islands National Park

PROCEDURE: Departed park headquarters via the Ocean Ranger at 0830 arriving at middle Anacapa at 0930. Kayaked ashore with all required gear landing at Middle West Anacapa Island. Unloaded sampling gear and kayaked around the north side of middle Anacapa observing local conditions and seabirds. Snorkeled in various areas observing lobster traps and invertebrate densities. Lobster traps near tidepool-monitoring sites were empty, red urchins sparse, and fish uncommon. A lobster boat checking traps appeared to have little success. At 1130 I started to locate accessible photoplots and clean epoxy corners. Began photographing plots at approximately 1200. Performed species census of plots and general species list1300-1350. Loaded gear and kayaked to Anacapa middle-east site. Photographed plots and noted conditions of plots.

RESULTS: 23 November 1999, Middle Anacapa: low tide -1.2 @1550 hrs, air temp 15°C, water temp 14.5°C, Clear skies, wind 5-15 mph NW, wave height 1-3 ft., surge moderate. One Harbor seal was observed in the water near the east site. Algae at Anacapa middle-west was diverse and abundant, *Silvetia sp*. was lush and abundant, *Hesperophycus sp*. was common. No obvious disturbances were visible. Sargassum was present in several pools at both sites. *Egregia sp*. and *Prionitis sp*. were common in the low tide areas. *Ulva sp.* was common in several photo plots at the west site. The temperature logger was not downloaded because it was never replaced after a previous failure. No stars or abalone were observed at either site. Personnel and tide time limited the scope of work.

Photoplot summary - mean percent cover at Middle East (three plots in each zone)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
ME	Barnacle	49.3	22.7	12.3	0.7	1.0	13.7	0.3
ME	Endocladia	24.7	7.3	18.7	25.3	2.3	21.7	0.0
ME	Rockweed	8.0	2.0	4.7	65.3	5.0	15.0	0.0
ME	Mussels	4.3	7.7	0.3	0.0	74.7	12.0	1.0

Photoplot summary - mean percent cover at Middle West (five plots in each zone)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
MW	Barnacle	35.8	17.4	27.4	1.4	0.0	18.0	0.0
MW	Endocladia	44.4	10.8	32.4	3.2	0.6	8.0	0.6
MW	Rockweed	18.8	2.4	4.0	59.2	1.2	14.0	0.4
MW	Mussels	15.0	6.2	1.2	0.0	59.8	17.0	0.8

Santa Cruz Island
December 6-10, 1999
(Database event 1999-I)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park

PROCEDURE: Dan Richards, four biologists from UCSB PISCO lab and myself arrived at Prisoner's Harbor via the OCEAN RANGER on 12/6. We spent the first and last nights at the UC research station and two nights camping on the West End. Four sites were monitored according to standard NPS protocol and the handbook for Santa Cruz Island. The UCSB PISCO group performed concurrent sampling at each site, replacing recruitment monitoring plates, scrubby pads, brushes, and shell bags. Sampling followed the “one-time survey” methods with vertical line transects assessing substrate cover and quadrats for determining mobile invertebrate numbers.

RESULTS: Upon arrival Monday, we proceeded to the UC research station to drop off gear and eat lunch before heading out to Willow's Anchorage for the low tide. Conditions on Santa Cruz Island were very dry with grasses brown, roads hard and in good condition, and pigs noticeably food deprived. Arrived at Willow's Anchorage at approximately 1400 hrs. Tuesday we traveled to the West End to sample at Trailers (Tuesday) and Fraser/Forney's sites (Wednesday). Camping conditions were excellent. Returned to the UC research station on Thursday in time to unload and sample at Prisoner's Harbor. Derek actively participated in the concurrent sampling after all NPS monitoring was completed and Dan accompanied UCSB lead biologist Carol Blanchett to Valley Anchorage to retrieve recruitment collection devices. Because of the late tides and the transect sampling by the PISCO group, we sampled until well after dark each night. Because of high winds, all boats were cancelled and we flew off Santa Cruz Island to Camarillo at 1030 12/10.

Willow's Anchorage: 12/6/1999, low tide -0.2 @ 1512 hrs, skies were clear, wind calm (less than 5 mph), seas calm, swell 1 ft. One black phoebe was observed at the site and several Western Gulls and Brown Pelicans were present on the offshore rocks. No marine mammals were observed in the area. Monitoring began at approximately 1400 hrs and continued until dark.

Dan photographed and censused plots, measured limpets within four of the five limpet plots, and took video for site documentation. Derek scored photoplots, completed the final limpet plot and did a 25-minute search over the entire site for sea stars (95 *Pisaster ochraceus*). The PISCO group did six transects, perpendicular to shore, between R2 and R3. Mussel recruitment from a couple of years ago still appears to be healthy. The lower shelf is dense with mussels about 2 cm. in length. A notably high density of *Nucella emarginata* was present in the mussel plots. Densities of *Lottia gigantea* within plots appeared unchanged, the majority of the individuals were small (less than 60 mm). *Endocladia muricata* was sparse within plots but robust areas were present on the vertical walls near the rockweed plots. *Silvetia compressa* was healthy and common. *Hesperophycus californicus* was present but sparse in plots. NPS monitoring was complete by 1730 hrs., but the PISCO group sampling continued till 1830.

Photoplot summary - mean percent cover by zone at Willow's Anchorage (20)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	MiscAlgae	MiscAnim	Tar
WA	Endocladia	70.4	2.4	22.4	0	0	0.8	4	0
WA	Rockweed	29.6	0.8	7.6	50	0	10	1.8	0.2
WA	Mussels	13.6	4.2	0	0	45.2	21.6	15.4	0
WA	Hesperophycus	57.2	3.4	4	24.6	0	8.8	2	0

Owl limpets in fixed plots at Willow's Anchorage

SiteCode	Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
WA	1	43	19.53	7.08	15	55	13.69
WA	2	13	24.85	8.91	15	45	4.14
WA	3	41	24.83	8.92	15	48	13.05
WA	4	29	28.03	12.43	15	58	9.23
WA	5	16	26.94	12.29	15	54	5.09

Owl limpet size distributions (percentage) in fixed plots at Willow's Anchorage (5)

SiteCode	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm
WA	62.79%	32.56%	2.33%	0.00%	2.33%
WA	23.08%	61.54%	0.00%	15.38%	0.00%
WA	26.83%	51.22%	9.76%	12.20%	0.00%
WA	31.03%	34.48%	13.79%	13.79%	6.90%
WA	31.25%	37.50%	12.50%	6.25%	12.50%

Trailers: 12/7/1999, low tide -0.3 @ 1541 hrs, skies clear, wind 25 mph NW, cold, seas 4 ft., swell 6 ft., heavy surge, air temp. 14°C and water temp. 14.5°C. No seabirds or marine mammals were observed at the site on arrival. Monitoring began at approximately 1300 hrs.

Working with the PISCO lab team again we all drove across the island this morning. Weather approaching from the NW with winds heavy and cold. Dan photographed plots and performed needed repairs while Derek scored random point contacts. We worked together measuring limpets in plots and performing surfgrass transects. Heavy surf conditions didn't allow for abalone or seastar searches to be completed. *Silvetia compressa* appeared to be doing very well. *Hesperophycus californicus* looked healthy but was not very dense throughout the area or in plots. Mussels covered approximately 60% of its respective zone with the remainder consisting of mostly bare rock, some *Pollicipes polymerus* was present but not much. *Endocladia muricata* was patchy throughout the site. *Phyllospadix sp*. transects were all primarily *Phyllospadix sp.* and we had to work quickly between large set waves. Owl Limpet plots all looked good with a range of sizes up to 80 mm, only L5 had low numbers. We located two black abalone (70 and 93 mm) near the limpet plots and observed a couple of small *Pisaster ochraceus* in limpet plot L1. The PISCO lab crew did transects along the first reef from the *Hesperophycus* plots to the mussel plots (6 transects).

Photoplot summary - mean percent cover by zone at Trailer site (20)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	MiscAlgae	MiscAnim	Tar
TR	Barnacle	64	28.2	4.6	0	0	0.8	2.4	0
TR	Rockweed	10.2	0.4	0	85.6	0	3.2	0.6	0
TR	Mussels	23.2	1.6	0.8	0	49.2	15.4	9.8	0
TR	Hesperophycus	47.4	4.4	12	34	0	1.8	0.4	0

Owl limpets in fixed plots at Trailer site

SiteCode	Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
TR	1	36	62.69	18.51	25	87	11.46
TR	2	31	52.94	20.06	17	87	9.87
TR	3	31	39.87	18.42	17	84	9.87
TR	4	51	51.67	10.71	28	73	16.24
TR	5	17	42.29	15.34	22	75	5.41

Owl limpet size distributions (percentage) in fixed plots at Trailer site (5)

SiteCode	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm
TR	0.00%	2.78%	16.67%	8.33%	8.33%	22.22%	22.22%	19.44%
TR	3.23%	16.13%	12.90%	6.45%	9.68%	25.81%	19.35%	6.45%
TR	12.90%	25.81%	12.90%	19.35%	9.68%	16.13%	0.00%	3.23%
TR	0.00%	1.96%	9.80%	25.49%	37.25%	19.61%	5.88%	0.00%
TR	0.00%	11.76%	41.18%	29.41%	0.00%	5.88%	11.76%	0.00%

Frazer/Forney's Cove: 12/8/1999, low tide -0.3 ft. @ 1615 hrs, partly cloudy, wind 5 mph NW, seas 1-2 ft., swell 4-6 ft, heavy surge, air temp. 20°C and water temp. 13.7°C. Three Black Oystercatchers and no marine mammals were observed on arrival to the site. Monitoring began at 1400.

Dan photographed and censused plots while I scored the RPC's. We measured limpets in plots and performed surfgrass transects jointly. *Chthamalus fissus/dalli* and *Balanus glandula* were abundant. *Mytilus californianus* were doing well and *Pollicipes polymerus*. was common in those plots. *Endocladia muricata* was lush and seemingly everywhere. Both *Hesperophycus californicus* and *Silvetia compressa* appeared healthy at the Forney's plots. *Chthamalus fissus/dalli* was common in the tar plots. *Porphyra perforata*, *Cladophora columbiana* and *Chaetomorpha lineum* were present. *Tegula funebralis* was present and *Tegula gallina* was rare. *Acanthina sp*. and *Nucella emarginata* were observed. *Nuttalina californica* and *Lepidochitona hartwegii* were present. *Lottia gigantea* was present over a large area of the site throughout the mussel zone. *Ulva sp.* was common throughout the site. *Phyllospadix spp*. was doing well and *P. torreyi* appear to be dominant in the lower tide region. *Egregia menziesii* was common. The PISCO team performed two parallel transects from the R2 bolt. Sampling continued into the night.

Photoplot summary - mean percent cover by zone at Frazer/Forney's Cove (35)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	MiscAlgae	MiscAnim	Tar
FC	Barnacle	31.8	21.4	36.4	0	1.2	7	0.6	1.6
FC	Endocladia	16.6	9	60.2	4.2	2.2	7.2	0.4	0.2
FC	Rockweed	9.6	1	3.6	79.6	0	5.8	0.4	0
FC	Mussels	10.8	0.6	0.2	0	68.8	6.8	12.8	0
FC	Pollicipes	15	6.6	1	0	40.8	9	27.6	0
FC	Tar	28	20.2	0	0	0	1	0.6	50.2
FC	Hesperophycus	49.8	6.4	11.8	17.2	0	14.6	0.2	0

Owl limpets in fixed plots at Frazer Cove

SiteCode	Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
FC	1	16	48.00	16.39	22	80	5.09
FC	2	8	59.13	8.49	44	67	2.55
FC	3	18	41.89	9.72	27	67	5.73
FC	4	23	33.57	8.61	19	51	7.32
FC	5	20	45.40	9.66	32	60	6.37

Owl limpet size distributions (percentage) in fixed plots at Frazer Cove (5)

SiteCode	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm
FC	0.00%	18.75%	12.50%	25.00%	12.50%	25.00%	0.00%	6.25%
FC	0.00%	0.00%	0.00%	12.50%	37.50%	50.00%	0.00%	0.00%
FC	0.00%	5.56%	38.89%	38.89%	11.11%	5.56%	0.00%	0.00%
FC	4.35%	26.09%	43.48%	17.39%	8.70%	0.00%	0.00%	0.00%
FC	0.00%	0.00%	25.00%	40.00%	30.00%	5.00%	0.00%	0.00%

Prisoner's Harbor: 12/9/1999, low tide -0.3 ft. @ 1659 hrs., light rain, wind calm, seas 1-2 ft., waves 1 ft., surge light, no air or water temp. Three Black Oystercatchers and two harbor seals (offshore) were observed at the site.

We drove back from the West End in the morning. The North side conditions were very nice when we arrived and the site was workable earlier than expected. Everything appeared to be in place. Dan photographed and did video of plots and performed a species census in plots only for the dominant species. Dan then went to Valley anchorage with the Carol to observe their monitoring site. Derek scored photoplots and helped the rest of the PISCO team finish their transects as rain began to fall consistently. *Hesperophycus californicus* was present but not abundant in the plots. *Silvetia perforata* and *Endocladia muricata* were doing very well. There were abundant bare patches in the mussel beds including at least a portion of each mussel plot. Barnacles were abundant in areas mostly *Chthamalus sp*. but *Balanus glandula* was present too. All the barnacle plots had a considerable amount of algae in them. B1 was bare rock except for some algal film, all the others had at least some *Silvetia sp*. and *Scytosiphon dotyi*. *Egregia menziesii*, *Chondracanthus canaliculatus* and *Gelidium purpurascens* were all common in the lower zone. Some *Sargassum muticum* and *Chondracanthus spinosus* was present and *Prionitis sp*. was rare. *Serpulorbis squamigera*. was abundant in plots. *Pseudochama exogyra* was quite common below the Hesperophycus plots.

Photoplot summary - mean percent cover by zone at Willow's Anchorage (25)

Site	Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	MiscAlgae	MiscAnim	Tar
PH	Barnacle	49.2	14.6	8	9.8	0	16.6	1.8	0
PH	Endocladia	29.6	22.2	34.6	1.6	0.2	9.6	2.2	0
PH	Rockweed	1.2	0	0	94	0	4.4	0.4	0
PH	Mussels	10.2	2.8	0	0	57.2	17.2	12.6	0
PH	Hesperophycus	44.2	25.2	15.8	9.6	0.2	3	2	0

San Miguel Island
January 3-7, 2000
(Database event #1999-J)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Tom Dore, Interpreter, Channel Islands National Park

PROCEDURE: Personnel arrived by plane about 1000 on Jan 3. Don Jones was also along to care for the island foxes. At each site shorebirds and pinnipeds were counted. Photoplots were photographed and scored in the field. Dominant species were noted in each plot. A general species list was made. Abalone plots were checked and a 30-minute search was made for abalone and sea stars. Owl limpets were measured in plots at Otter Harbor and Crook Point. Mobile invertebrates (snails, limpets, chitons, crabs, and sea urchins) were counted in the photoplots at each site. Video and area photos were shot. GPS locations were recorded for all plots and reef outlines except at Cuyler Harbor. Shore birds were counted on Simonton Cove beach, but no snowy plovers were present.

The island was quite dry. Little was flowering yet, and the giant coreopsis was leafed out but not very lush. Northern Harriers were commonly seen including 4-5 hiking back from the dry lakebed. Barn owls were common. A burrowing owl was seen and a pair of peregrine falcons was observed over the ranch area every day.

RESULTS:
January 3, 2000 Cuyler Harbor: low tide –0.2 ft at 1438 hrs, air temperature 20° C water 13° C, wind 5 mph NW, clear sky, light surge. We worked on site from 1300-1700 hrs. One elephant seal was present on the beach next to the site. Three Whimbrels and 1 Black Oystercatcher on the beach were the only shorebirds in the area.
During a 30-minute search extending around the point, 23 seastars (*Pisaster ochraceus*) and no abalone were found. Mobile invertebrates were counted in all plots, though small limpets were not counted in the first three mussel plots. *Nucella emarginata* were common in all zones. Hermit crabs were uncommon at the site. Barnacles, *Balanus glandula* were abundant. *Silvetia compressa* was abundant throughout the narrow rockweed zone. *Hesperophycus californica* was not present. *Phragmatopoma californica* was abundant, filling some of the narrow crevices on the site. *Endocladia muricata* was common. Shore crabs, *Pachygrapsus crassipes* were present but not abundant. Predatory snails were quite common, being found in almost every photoplot. As many as 41 *Nucella emarginata* were found in one photoplot area (50x75 cm). Small limpets were numerous in each of the photoplots. *Tegula funebralis* and *Acanthina* sp. were commonly found in the plots as well.

Mean %cover for photoplots at Cuyler Harbor, San Miguel Island (20 Plots)

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
Barnacle	61.6	32.4	4.6	0.2	0.2	1.0	0.0
Endocladia	46.0	7.8	28.0	9.8	2.8	4.4	1.2
Rockweed	7.4	0.4	0.0	82.4	0.2	6.4	3.2
Mussels	19.8	7.6	0.0	0.0	59.2	3.4	10.0

Mobile invertebrate counts in 50 x75 cm photoplot areas at Cuyler Harbor 1/3/2000

Zone	Plot No.	Tegula funebralis	# Littorina spp.	# Acanthina sp.	# Ocenebra circumtexta	# Nucella emarginata	# Limpets	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	416	2	61			1	15					
Barnacle	417		168				15					
Barnacle	418	1	140	2			35	1				
Barnacle	419		448				30					
Barnacle	420	2	224			3	26					
Endocladia	411	7	5	3		6	60		1	2	6	
Endocladia	412		12			3	27					
Endocladia	413	21	3	9		4	41			6		
Endocladia	414	20				1	42	1				
Endocladia	415	43	10	1		3	84					
Rockweed	406	21		6		1	29		1	5	3	
Rockweed	407	47				2	32			17		
Rockweed	408	1	3	1		3	36		2	4		
Rockweed	409	10	2	4		2	21		2	3		
Rockweed	410	3	1	1	2	14	353			8		2 P.c.
Mussel	401					27	nc		5		11	
Mussel	402					41	nc	2	5	1	2	1 P.c.
Mussel	403					20	nc	4	3		5	2 S. p.
Mussel	404					34	58		6	1	21	
Mussel	405					25	59		16	1	10	

(Other species = S. p. *Strongylocentrotus purpuratus*, P. c. *Pachygrapsus crassipes*)

January 4, 2000 Otter Harbor: low tide –0.4 ft at 1510 hrs, air temp 13°C, water temp 13°C, wind 20-25 mph NW, sky clear, surge light. We worked on site from 1200-1630 hrs. The morning started out calm but winds increased throughout the day as a front passed by. Seventeen harbor seals, 30 elephant seals, 24 cormorants, 40 willets and 2 wandering tattlers were observed at the beach and rocks just east of the monitoring site. At the monitoring site reef there were 61 harbor seals, 1 killdeer, 6 black turnstones, 15 black-bellied plovers, 3 black oystercatchers, and at least 2 western gulls. Another elephant seal was on the beach adjacent to the reef. The number of elephant seals along the shore seemed low for this time of year. There were two sea urchin boats working the western Simonton area.

The splash zone down into the barnacles was generally covered by *Bangia fusco-purpurea*. *Enteromorpha* sp. was common. The tidepool copepods, *Tigriopus californicus*, were abundant in pools. *Balanus glandula* were present in high density but patchy. *Endocladia muricata* and *Silvetia compressa* were both common. *Hesperophycus californica* was only present and was difficult to distinguish from *Silvetia* by color. *Sargassum muticum* was present in some lower tidepools. Purple urchins were abundant in tidepools and dominate the pool by abalone plot 367. Several purple urchins were observed that were “balding”, an indication of disease. The lower zone around the site was densely covered by red algae, almost appearing black. *Mazzaella affinis*, *Mastocarpus papillata* and *Chondracanthus canaliculatus* dominated this zone. These species dominate the wall where abalone plot 365 and barnacle plot 374 area.

Derek counted and measured 57 black abalone in 30-minutes, covering about half the reef. Black abalone, *Haliotis cracherodii*, were in crevices around the site and at least this many were present on the other half of the reef. Only two abalone were present in the plots, both in plot 369. Relatively few shells were found and most of the smallest shells were red abalone, *H. rufescens*. A total of 32 *Pisaster ochraceus*, 3 *P. giganteus* and 1 *Asterina miniata* were found in a separate 30-minute search for seastars. About 45 minutes was spent on general species list.

We counted mobile invertebrates in the first three photoplots of each zone and did not enumerate the *Littorina* sp. in plots with over 100 (all of the barnacle plots). Littorina were present in low numbers in the other non-mussel plots. Mussel plots had moderate numbers of *Nucella emarginata*. Owl limpets, *Lottia gigantea,* were common throughout the mussel zone, found on mussel shells and on rock between mussels. Owl limpet numbers within the abalone plots where they are monitored were down slightly from last fall, however these plots can be variable. Small limpets were common in most plots. The highest density of limpets was recorded in one of the barnacle plots (#472) but rare or absent in the other barnacle plots (471 and 470).

Algal cover dominated two of the barnacle plots. Plot 370 was covered by *Porphyra perforata* and *Enteromorpha* sp. Plot 374 was dominated by the red algal assemblage of *Mastocarpus pappilatus, Mazzaella affinis* and *Chondracanthus canaliculatus*. Both *Hesperophycus californicus* and *Silvetia compressa* were present in most of the rockweed plots. Plot 359 had almost no rockweed and is dominated by *Balanus glandula* and bare rock. Mussel cover was generally one layer thick with medium sized mussels.

Mean % cover for Photoplots at Otter Harbor, San Miguel Island (20 Plots)

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	26.4	25.0	0.0	0.0	0.0	46.2	0.0	2.4
Endocladia	15.8	0.0	48.4	21.6	1.6	11.8	0.8	0.0
Rockweed	22.2	9.4	19.8	40.6	0.0	7.8	0.0	0.2
Mussels	11.6	1.8	0.2	0.0	63.2	15.6	7.6	0.0

Owl Limpets at Otter Harbor, San Miguel Island

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
368	33	39.94	15.34	21	77	8.919
369	81	37.33	15.11	17	82	11.912
496	9	51.22	15.80	34	76	.563

Owl Limpets percentage within size classes at Otter Harbor, San Miguel Island

Plot	Count	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm
368	33	0.00%	33.33%	30.30%	6.06%	18.18%	9.09%	3.03%	0.00%
369	81	6.17%	33.33%	22.22%	12.35%	20.99%	2.47%	1.23%	1.23%
496	9	0.00%	0.00%	44.44%	0.00%	22.22%	11.11%	22.22%	0.00%

Black Abalone at Otter Harbor, San Miguel Island

Plot	Count	MeanSize	StDev	MinSize	MaxSize
367	1	85.00		85	85
369	2	89.00	25.46	71	107
Random	55	78.75	21.45	47	124

Random = 30 minute general search of site

Black Abalone percentage within size classes at Otter Harbor, San Miguel Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
367	1	0.00%	100.00%	0.00%	0.00%
369	2	0.00%	100.00%	0.00%	0.00%
Random	55	0.00%	100.00%	0.00%	0.00%

Mobile invertebrate counts in 50 x75 cm photoplot areas at Otter Harbor 1/4/2000

Zone	Plot No.	Tegula funebralis	# Littorina spp.	# Acanthina sp.	# Ocenebra circumtexta	# Nucella emarginata	# Limpets	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	370		Many				0					
Barnacle	371		Over 400				3					
Barnacle	372		many				55					
Endocladia	360	3	12			1	68		1	2	2	
Endocladia	361	2	15				34			1	4	
Endocladia	362		2				15		2		4	
Rockweed	355		24				6		1	1		
Rockweed	356		9			1	35			4	5	
Rockweed	357		1				26		3	1	2	
Mussel	375	1				6	33		9	3	5	
Mussel	376	1				9	33		5		4	1 P.c.
Mussel	378					13	16	1	12		6	1 S.p.

(Other species= S. p. *Strongylocentrotus purpuratus*, P. c. *Pachygrapsus crassipes*)

January 5, 2000 Crook Point: low tide –0.5 ft at 1540 hrs, air temp 14.5°C, water temp 12°C, wind 25 mph NW, sky clear, surge light.
With the low swell, the site was workable when we arrived at noon. We were on site until 1730 hrs. About 10 cormorants left the reef as we approached. Ten Black Turnstones worked the outer reef as we worked around the site. There were three large male elephant seals on the site including one up on the rocks that stayed throughout our visit. Two boats were in Tyler bight and one urchin boat was anchored inside of Wyckoff Ledge, despite the high winds.

Tom counted 206 *Pisaster ochraceus* in 30 minutes, and the abalone plots had 11 seastars. About 45 minutes was spent on general species list observations. Derek found 22 black abalone in a 30-minute general search and found 2 abalone in plot 393. There were no *Lottia gigantea* in the abalone plots, now dominated by *Phragmatopoma californica*.

The surge channel had abundant algae growing on the rocks (*Polysiphonia sp. Chondracanthus spinosus* and *Porphyra perforata). Gracilaria sp., Neoagardiella sp.* and *Stennogramme interrupta* were growing in the sand. *Ulva* and *Bangia fusco-purpurea* were common on top of the outer reef. Small mussels were abundant, especially on the inner reef where they densely covered most of the plot corners. Mussels dominate all of rockweed plot 397, which is on about the same level as the mussel plots. Rockweed cover was thin in all the rockweed plots, ranging 0-13%. Both *Silvetia* and *Hesperophycus* were present.

Lirttorina sp. were common in all but the outer reef mussel plots. Small limpets were very abundant. Predatory snails and chitons were mostly uncommon.

Mean % cover for Photoplots at Crook Point, San Miguel Island (20 Plots)

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
Barnacle	63.2	32.4	1.8	0.0	0.4	1.0	1.2
Endocladia	52.6	9.4	18.0	1.0	7.6	7.4	4.0
Rockweed	41.2	3.8	5.4	7.0	20.8	17.6	4.2
Mussels	9.2	2.4	0.0	0.0	80.2	5.8	2.4

Black Abalone at Crook Point, San Miguel Island

Plot	Count	MeanSize	StDev	MinSize	MaxSize
394	2	88.00	5.66	84	92
Random	21	93.71	24.85	50	141

Random = 30 minute general search of site

Black Abalone percentage within size classes at Crook Point, San Miguel Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
394	2	0.00%	100.00%	0.00%	0.00%
Random	21	0.00%	90.48%	9.52%	0.00%

Mobile invertebrate counts in 50 x75 cm photoplot areas at Crook Point 1/5/2000

Zone	Plot No.	Tegula funebralis	# Littorina spp.	# Acanthina sp.	# Ocenebra circumtexta	# Nucella emarginata	# Limpets	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	137		290				28					
Barnacle	147		400+				28					
Barnacle	148		202				2					
Barnacle	149		179				189					
Barnacle	150		200+				95					
Endocladia	386		196				448					
Endocladia	387		43			1	177			1	2	
Endocladia	388		173				306					
Endocladia	389		Nc			3	nc			2		
Endocladia	390		204				146					
Rockweed	396	1	181			2	87			4	2	
Rockweed	397	7	12				45					
Rockweed	398		60			2	194			7	1	
Rockweed	399		37			1	27					
Rockweed	400		109			1	404		1	1	1	
Mussel	381		12			1	84		2	3	1	
Mussel	382		11				131					
Mussel	383	5					59					
Mussel	384					6	83		1		5	1 S.p.
Mussel	385						70		1		3	3 S.p.

(Other species= S. p. *Strongylocentrotus purpuratus*)

January 6, 2000 Harris Point: low tide –0.6 ft at 1611 hrs, air temp 13.5°C, water temp 12.5°C, wind 5-8 mph NW, sky partly cloudy, surge moderate.
We walked Simonton Cove beach in the morning and examined the wreckage of a trimaran sailboat than came ashore last summer. Two boats were working in the Castle Rock area. Five boats were in Cuyler Harbor this night, the most we had seen all week. There were 15 Whimbrels, 5 Black-bellied Plovers, and two elephant seals on the beach. A flock of about 30-40 Whimbrels was foraging up near the top of Harris Point. One elephant seal was on Secret Cove beach. At the site, eight harbor seals, two Black Oystercatchers and one Black Turnstone were noted.

The red algal assemblage of *Mazzaella affinis, Mastocarpus papillatus* and *Chondracanthus canaliculatus* dominate the lower intertidal including the lower portion of the abalone plots, the central cobble area and completely covers barnacle plot 438. Fresh tar was present and was even floating in some tidepools. *Hesperophycus californicus* was the only rockweed present and fairly sparse, never forming a dense zonal band. *Endocladia muricata* and *Balanus glandula* were both doing well. *Tetraclita rubescens* was abundant. Four of the barnacle plots at this site were set up around *Tetraclita* (though 436 seems to have both in about equal numbers) and one over *Balanus*. Mussels at this site were not particularly dense anywhere though three of the plots were near or over 50% cover.

Littorina sp. and small limpets (*Lottia* spp.) were present in high numbers and because of the time we did not count them in the mobile invertebrate counts. Several plots had no

other animals. *Nucella emarginata* were common being present in nearly all plots with a maximum density of 30 per plot. Owl limpets were common in the plots. Large owl limpets still seem to occur in numbers reasonable for monitoring on the western side of the site.

Tom counted 29 *Pisaster ochraceus* in 30-minutes. The crevice transect had 6 *P. ochraceus*. There was not a 30-minute search for abalone however, there were 8 black abalone in the plots and 5 more in the crevice transect. The temperature logger was lost. The brackets were torn away (presumably rusted out) and the PVC-housing was gone.

Mean % cover for Photoplots at Harris Point, San Miguel Island (20 Plots)

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
Barnacle	39.0	22.2	1.6	0.0	9.0	26.0	2.2
Endocladia	45.4	6.2	41.0	1.8	1.4	3.0	1.0
Rockweed	42.8	1.8	23.2	29.2	0.0	2.4	0.4
Mussels	40.8	4.4	1.6	0.0	44.0	7.2	2.0

Black Abalone at Harris Point, San Miguel Island

Plot	Count	MeanSize	StDev	MinSize	MaxSize
443	4	102.50	24.08	76	132
444	2	109.50	13.44	100	119
445	2	108.00	45.25	76	140
Random	5	68.00	14.71	54	93

Random = 30 minute general search of site

Black Abalone percentage within size classes at Harris Point, San Miguel Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
443	4	0.00%	75.00%	25.00%	0.00%
444	2	0.00%	100.00%	0.00%	0.00%
445	2	0.00%	50.00%	50.00%	0.00%
Random	5	0.00%	100.00%	0.00%	0.00%

Mobile invertebrate counts in 50 x75 cm photoplot areas at Harris Point 1/6/2000

zone	Plot No.	Tegula funebralis	# Acanthina sp.	# Ocenebra circumtexta	# Nucella emarginata	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	436			6	30		18	2	14	
Barnacle	437				8		15		50	1 P.c.
Barnacle	438	1		11				1		
Barnacle	439			15	20		3	1	4	
Barnacle	440									
Endocladia	431				4		3	1	4	1 P.c.
Endocladia	432				4					
Endocladia	433				2					
Endocladia	434									
Endocladia	435							1		
Rockweed	421									
Rockweed	422				1				1	
Rockweed	423	1			2					
Rockweed	424									
Rockweed	425				2					1 P.c.
Mussel	426				12		15	1	2	1 P.c.
Mussel	427				11		2		2	
Mussel	428				5			1		
Mussel	429				14		4	1		4 S.p. 3 P.c. 1 M.m.
Mussel	430				9		2		7	2 S.p. 3 P.c.

(Other species= S. p. *Strongylocentrotus purpuratus*, P.o. *Pisaster ochraceus*, M.m.-Mopalia sp, P. c. *Pachygrapsus crassipes*). Note: Littorina and limpets were not counted.

Santa Rosa Island
January 17-21, 2000
(Database event #1999K)

PERSONNEL: Derek Lerma, Biological Technician, Channel Islands National Park
David Kushner, Marine Biologist, Channel Islands National Park
Sarah Fangman, Research Coordinator, CINMS
Dave Brooks, Maintenance Supervisor, Channel Islands National Park

PROCEDURE: Arrived Santa Rosa Island at 1000 hours via CIA. Light rain fell off and on for the first two days. The island was still very dry with small amounts of green grass and few flowers present. Shorebirds and pinnipeds were counted at each site and additionally at several locations near monitoring locations. Photoplots were photographed and scored in the field. Dominant species were noted in each plot. Abalone plots were checked and a 30-minute search was made for abalone and sea stars. Owl limpets were measured at each site with permanent plots. Mobile invertebrates (snails, limpets, chitons, crabs, and sea urchins) were counted in the photoplots at each site. Video and area photos were shot. Elephant seal counts were performed north of Fossil Reef up to Sandy Point. Elephant seals numbered over a 1000 with the majority of females having pups. Fox tracks and fresh scat were observed in several locations and reported to park wildlife biologists. Dave Brooks participated on Monday and Tuesday before leaving and Sarah stayed until Thursday morning.

RESULTS:

January 17, 2000 East Point: low tide - 0.5 ft. @ 1328 hrs, air temp 14.0°C, water temp 13.5°C, wind 5mph SSE, light rain, light surge, swell 2-3 ft.

We arrived at the lagoons at 1145 hours. Observed two snowy plovers and a Great Blue Heron at the beach in front Old Ranch House Canyon Lagoon. Ninety-six harbor seals and 200+ Western Gulls were present at Abalone Rocks. Worked on site from 1220 to 1600 hours. One Great Blue Heron, 4 Whimbrels, 3 Black Oystercatchers and one Kite were observed at the East Point site. During a 30-minute search throughout the site two black abalone (122mm and 78mm) were observed, both healthy. A 30-minute search for seastars performed by two separate observers in the same area counted 78 and 81 seastars (*Pisaster ochraceus*). Mobile invertebrates were counted in all photoplot areas, *Lottia spp*. limpets < 1 cm and *Littorina spp*. were not counted. The temperature logger was not downloaded because the reader was in use at Santa Barbara Island. Overall algae was abundant and lush. *Ulva sp*. and *Cladophora columbiana* were abundant in the rockweed and mussel zone. *Hesperophycus californicus* was common and appeared to have healthy new growth. *Endocladia muricata* was abundant but noticeably less dense in plot areas. Tidepools contained numerous sculpins and juvenile opaleye. *Aplysia californica* and *Strongylocentrotus purpuratus* were common. No video footage was taken due to wet rainy conditions.

Photoplot summary- Mean percent cover by zone at East Point, Santa Rosa Island

Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	48.0	28.6	13.8	3.8	0.2	5.6	0.0	0.0
Endocladia	9.8	2.4	71.4	15.2	0.0	0.6	0.6	0.0
Rockweed	4.8	0.2	0.0	86.4	0.0	7.8	0.8	0.0
Mussels	2.4	0.6	0.0	0.0	83.0	6.4	7.6	0.0

Black Abalone at East Point, Santa Rosa Island (30 minute search)

Count	MeanSize	StDev	MinSize	MaxSize
2	100.00	31.11	78	122

Black Abalone percentage within size classes at East Point, Santa Rosa Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
Random	2	0.00%	100.00%	0.00%	0.00%

Mobile invertebrate counts in 50 x75 cm photoplot areas at East Point 1/17/2000

zone	Plot No.	Tegula funebralis	# Littorina spp.	# Acanthina sp.	# Ocenebra circumtexta	# Nucella emarginata	# Limpets	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	575						3					
Barnacle	576	25		3		2						1 P.c.
Barnacle	577											
Barnacle	578						1					
Barnacle	579											
Endocladia	580	1				1						
Endocladia	581					4	1					
Endocladia	582	1				4						
Endocladia	583	2		1		2						
Endocladia	584			3		2				1		
Rockweed	585	45		11		3	2			3		
Rockweed	586	25		8		1	2			2		
Rockweed	587	43		13		2	6			4		
Rockweed	588	6		6		6	5			9		
Rockweed	589			10		4	3			4	1	
Mussel	590	2		1		16		4		2	2	2 P.c.
Mussel	591			1	1	21		1		4	3	
Mussel	592					7	1	2			2	
Mussel	593				1	13						1 P.c.
Mussel	594			2		15		3			6	

- (Other species= P. c. *Pachygrapsus crassipes*

January 18, 2000 Johnson's Lee: low tide - 1.1 ft. @ 1415 hrs, air temp 18.0°C, water temp 13.5°C, wind calm SSE, light surge, swell 1-3 ft.
Worked site from 1030 to 1230 hours. Departed housing site complex 0830 to Johnson's Lee. Dave Brooks removed three locksets from the Johnson's Lee garages for Kent Bullard. The weather was unusually warm and nine light boats and two squid seiners were anchored approximately 1 mile offshore. No seabirds and only one harbor seal offshore were observed at the site. Photoplots were photographed, scored and censused. A 30-minute search for abalone produced only one individual (143mm). During a 30-minute search for seastars two individuals made separate counts in the same area, 580 and 601 *Pisaster ochraceus*. An effort was made to stay within the site area for all 30-minute searches. Limpet plots were sampled for Owl limpets, *Lottia gigantea*. The site appeared healthy and undisturbed. Mussel beds were thick with some recruitment evident. *Ulva sp*. and *Cladophora columbiana* were common throughout the west portion of the sight below the mussel zone. *Chondracanthus canaliculatus* and *Mazzaella affinis* were common. *Strongylocentrotus purpuratus* recruitment was very high in the tidepools with most individuals small in size. Tunicates, sponges and anemones were abundant in lower surge channels. *Phyllospadix sp*. was abundant and healthy. *Phragmatopoma californica* continues to dominate areas and even appears to be expanding. Sculpin and Opaleye were common in pools and *Anthopleura xanthogrammica* was observed. Limited time was available at this site in order to sample Ford Point on the same tide.

Photoplot summary- Mean percent cover by zone at Johnson's Lee, Santa Rosa Island

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	53.6	36.8	5.4	0.0	0.2	2.6	1.4	0.0
Endocladia	42.0	3.0	35.2	0.0	12.0	6.0	1.8	0.0
Mussels	9.6	2.0	0.2	0.0	19.2	12.2	56.8	0.0

Black Abalone at Johnson's Lee, Santa Rosa Island (30 minute search)

Count	MeanSize	StDev	MinSize	MaxSize
1	143.00		143	143

Black Abalone percentage within size classes at Johnson's Lee, Santa Rosa Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
Random	1	0.00%	0.00%	100.00%	0.00%

Owl Limpets at Johnson's Lee, Santa Rosa Island

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
595	9	36.00	16.12	21	59	2.865
596	23	52.74	19.36	18	77	7.323
597	4	35.75	18.23	22	62	1.273
598	25	39.32	20.05	17	80	7.959
599	35	38.54	16.02	18	69	11.143

Owl Limpets percentage within size classes at Johnson's Lee, Santa Rosa Island

Plot	Count	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm
595	9	0.00%	44.44%	22.22%	0.00%	33.33%	0.00%	0.00%	0.00%
596	23	4.35%	17.39%	4.35%	13.04%	4.35%	39.13%	17.39%	0.00%
597	4	0.00%	50.00%	25.00%	0.00%	0.00%	25.00%	0.00%	0.00%
598	25	8.00%	44.00%	12.00%	4.00%	8.00%	12.00%	8.00%	4.00%
599	35	8.57%	25.71%	31.43%	8.57%	5.71%	20.00%	0.00%	0.00%

January 18, 2000 Ford Point: low tide - 1.1 ft. @ 1415 hrs, air temp 18.0°C, water temp 14.0°C, wind 1-3 mph SSW, light surge, swell 1-3 ft.
Traveled from Johnson's Lee to Ford Point arriving at 1300 hours. Photographed, scored and censused all photoplots. During a 30-minute search for abalone D. Kushner located 5 individuals (135mm, 108mm, 93mm, 91mm, and 100mm), all appeared healthy. Two people performed separate 30-minute searches for seastars, in the same area, producing counts of 612 and 627 *Pisaster ochraceus.* Mobile invertebrate counts were performed in all photoplots, *Lottia spp*. limpets <1cm and *Littorina sp*. were not counted in any of the plots. General site observations and video documentation were made. In general the site appeared unchanged from previous samplings with exception of sedimentation and scouring evident on the eastern portion of the reef. *Lottia gigantea* plots contained mostly large individuals with little obvious recruitment. *Ulva sp*. and *Cladophora columbiana* were common throughout the site, similar to Johnson's Lee. Tunicates, sponges and *Phragmatopoma californica* were abundant. Squid boat presence was increasing throughout the day reaching nearly thirty boats in all outside Ford Point/Johnson's Lee area. An urchin boat, SLING SHOT, was working just offshore of the site. Weather was exceptionally warm and calm.

Photoplot summary- Mean percent cover by zone at Ford Point, Santa Rosa Island

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	66.2	27.6	0.0	0.0	0.0	1.4	4.8	0.0
Endocladia	36.2	1.2	42.6	0.0	7.8	10.0	2.2	0.0
Mussels	27.6	0.6	0.6	0.0	56.0	11.6	3.6	0.0

Black Abalone at Ford Point, Santa Rosa Island (30 minute search)

Count	MeanSize	StDev	MinSize	MaxSize
5	104.40	17.80	91	135

Black Abalone percentage within size classes at Ford Point, Santa Rosa Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
Random	5	0.00%	80.00%	20.00%	0.00%

Owl Limpets at Ford Point, Santa Rosa Island

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
600	14	42.93	24.80	16	74	4.457
601	19	56.16	15.14	15	72	6.049
602	21	70.19	15.44	37	92	6.686
603	24	60.67	20.40	16	84	7.641
604	26	44.50	20.57	17	77	8.278

Owl Limpets percentage within size classes at Ford Point, Santa Rosa Island

Plot	Count	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm
600	14	28.57%	21.43%	0.00%	0.00%	7.14%	35.71%	7.14%	0.00%	0.00%
601	19	10.53%	0.00%	0.00%	0.00%	36.84%	42.11%	10.53%	0.00%	0.00%
602	21	0.00%	0.00%	9.52%	4.76%	9.52%	9.52%	38.10%	23.81%	4.76%
603	24	4.17%	8.33%	8.33%	4.17%	8.33%	16.67%	41.67%	8.33%	0.00%
604	26	7.69%	19.23%	19.23%	19.23%	3.85%	11.54%	19.23%	0.00%	0.00%

Mobile invertebrate counts in 50 x75 cm photoplot areas at Ford Point 1/18/2000

zone	Plot No.	Tegula funebralis	# Littorina spp.	# Acanthina sp.	# Ocenebra circumtexta	# Nucella emarginata	# Limpets >1 cm	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	520	0	0	0	0	0	6	0	2	0	0	
Barnacle	521	0	0	0	0	0	7	0	0	1	0	
Barnacle	522	0	0	0	0	0	0	0	0	0	0	
Barnacle	523	0	0	0	0	0	0	0	0	0	0	
Barnacle	524	0	0	0	0	0	0	0	0	0	0	
Endocladia	525	0	0	0	0	1	6	0	0	1	1	
Endocladia	526	0	0	0	0	1	4	0	0	0	0	
Endocladia	527	0	0	0	0	3	0	0	1	1	0	
Endocladia	528	0	0	0	0	1	10	0	2	0	2	
Endocladia	529	1	0	0	0	7	3	0	3	0	1	
Mussel	530	0	0	0	0	0	17	0	4	0	1	
Mussel	531	0	0	0	0	3	0	0	0	0	0	
Mussel	532	0	0	0	0	4	1	1		0	2	3 P. c.
Mussel	533	1	0	0	0	2	0	1	2	0	1	
Mussel	534	1	0	0	0	4	0	1	4	1	4	

P. c. *Pachygrapsus crassipes*)

January 19, 2000 Fossil Reef: low tide - 1.5 ft. @ 1515 hrs, air temp 17.5°C, water temp 14.5°C, wind 2-4 mph WSW, light surge, swell 2 ft.
Arrived on site at 1030 hour and began counting Elephant seals on beaches both sides of the monitoring site. Distribution of animals appears to be spreading in both the North and South directions. The majority of females had pups and a summary of the population distributions on surveyed beaches is included in Table 1. Sampling was performed from 1200 to 1630 hours. Photoplots were photographed, scored and censused for species. Limpet plots were monitored for only the second time since installation and appear to represent surrounding populations accurately. During a 30-minute search for abalone seven individuals were located (see data sheet). An additional eight black abalone were located just south of the site with four between the sizes of 50-60mm, inferring some recent recruitment. A 30-meter seastar transect on the outer reef was performed finding 41 seastars (*Pisaster ochraceus*). Mobile invertebrates were counted within all photoplots with *Lottia spp*. limpets < 1cm and *Littorina sp*. not counted. Overall algae was abundant and healthy. *Endocladia muricata* was sparse in plots and *Silvetia compressa* was mature and abundant. *Ulva sp., Cladophora columbiana*, and *Codium fragile* were common. *Chondracanthus canaliculatus* was abundant. Mussels were sparse in plots with *Pollicipes polymerus*, *Tetraclita rubescens*, miscellaneous algae, and *Phragmatopoma californica* making up nearly 85% of the cover in this zone. *Tegula funebralis* was abundant. Common species included *Egregia menziesii*, *Halidrys/Cystoseira*, *Chondracanthus spinosus, Eisenia arborea.,* Red Sponges, and Sculpins. Also observed were *Tonicella lineata*, Opaleye, Ophiuroids, *Aplysia californica*, *Strongylocentrotus franciscanus*, and *Megathura crenulata*.

Table 1. Elephant Seal Counts for areas adjacent and North of Fossil Reef, Santa Rosa Island

Area	Bulls	Females	Pups	Dead pups
1st cove N of site	3	59	43	1
2nd cove going N	5	53	40	
Main Beach	16	274	185	
Cove between Main and E. Cove	12	41	33	
Elephant Seal Cove	12	103	57	
Sandy Point Beach	12	21	6	
1st Beach S. of site	14	19	6	

Photoplot summary- Mean percent cover by zone at Fossil Reef, Santa Rosa Island

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	59.2	34.0	0.4	0.0	0.0	1.6	2.0	2.8
Endocladia	35.2	18.4	7.4	35.0	0.0	1.8	2.2	0.0
Rockweed	66.8	6.8	3.8	18.0	0.0	2.8	1.8	0.0
Mussels	12.8	8.0	0.6	0.0	11.6	37.6	29.4	0.0

Black Abalone at Fossil Reef, Santa Rosa Island (30 minute search)

Count	MeanSize	StDev	MinSize	MaxSize
6	116.67	38.65	48	162

Black Abalone percentage within size classes at Fossil Reef, Santa Rosa Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
Random	6	0.00%	50.00%	33.33%	16.67%

Owl Limpets at Fossil Reef, Santa Rosa Island

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
1	29	48.17	19.38	16	78	9.233
2	35	50.37	17.13	15	78	11.143
3	43	64.53	19.59	19	94	13.690
4	84	56.32	14.72	15	83	26.743
5	89	44.09	15.95	17	74	28.335

Owl Limpets percentage within size classes at Fossil Reef, Santa Rosa Island

Plot	Count	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm
1	29	6.90%	20.69%	6.90%	6.90%	20.69%	27.59%	10.34%	0.00%	0.00%
2	35	2.86%	11.43%	20.00%	8.57%	17.14%	25.71%	14.29%	0.00%	0.00%
3	43	2.33%	2.33%	6.98%	13.95%	11.63%	13.95%	20.93%	20.93%	6.98%
4	84	3.57%	1.19%	10.71%	11.90%	22.62%	35.71%	11.90%	2.38%	0.00%
5	89	3.37%	22.47%	15.73%	16.85%	22.47%	14.61%	4.49%	0.00%	0.00%

Mobile invertebrate counts in 50 x75 cm photoplot areas at Fossil Reef 1/19/2000

zone	Plot No.	Tegula funebralis	# Littorina spp.	# Acanthina sp.	# Ocenebra circumtexta	# Nucella emarginata	# Limpets >1 cm	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	605						5					
Barnacle	606	5		1								
Barnacle	607						4					
Barnacle	608	0										
Barnacle	609	5		2			5				2	
Endocladia	610	8		3			5					
Endocladia	611	2					5					
Endocladia	612	157		6	1		9			8		
Endocladia	613	12		11			5			1		
Endocladia	614	93		10	2		8			11		
Rockweed	620					3		1			24	22 S.p., 1 P.c., 1 P.o.
Rockweed	621				2	2		4			76	5 S. p., 3 P.c.
Rockweed	622					7	4	3	4	1	49	6 S.p., 1 P.c.
Rockweed	623					6	4		8	1	36	3 S.p. 2 P.c.
Rockweed	624					7		6				14 S.p. 4 P.c. 1 P.o.
Mussel	615	58		3			11			2	1	
Mussel	616	51		2			7				1	
Mussel	617	53		1			7					
Mussel	618	23		2			5			2	1	
Mussel	619	7		1			4					

* (Other species= S. p. *Strongylocentrotus purpuratus*, P.o. *Pisaster ochraceus*, P. c. *Pachygrapsus crassipes*)

January 20, 2000 Northwest Talcott: low tide - 1.7 ft. @ 1543 hrs, air temp 15.0°C, water temp 14.0°C, wind 5-10 mph W, light surge, swell 1-2 ft.
Arrived at site access point at 1030 hours. *Castilleja mollis* was not yet blooming. Hiked east towards Arlington Canyon past Orr's Camp. Observed two Harbor seals, one Great Blue Heron, two Elephant seal bulls and numerous signs of island foxes and spotted skunks. Returned to site access point at approximately 1200 hours. Continued cliff

erosion is making access increasingly dangerous. A small aluminum fishing boat (15-18ft.) was broken up on the reef just east of the monitoring site. The boat appeared to have been used in the live fishing industry from visible hardware. Photoplots were photographed, scored and censused for species. During the 30-minute search for abalone only one individual was located (143mm), two additional abalone were located in later survey's (151mm and 158mm), one was outside the plot area. Limpet plots were monitored according to protocol and contained individuals of all sizes. A 30-minute search for seastars produced a high number of giant-spined seastars, 10 *Pisaster giganteus*, likely a function of the extreme low tide conditions. Mobile invertebrates were counted within all photoplots with *Lottia spp*. limpets < 1cm and *Littorina sp*. not counted. Overall the site appeared healthy and undisturbed. Algae were lush and abundant. *Silvetia compressa* was mature and notably elongated. *Endocladia muricata* was sparse in plots but abundant throughout the site. *Cladophora columbiana* and *Ulva sp*. were common in the upper intertidal. Mussel plots were patchy with no obvious recruitment evident. Lower than average tide conditions exposed several subtidal species. *Strongylocentrotus franciscanus, Megathura crenulata, Lithopoma undosa, Sargassum muticum, Tegula gallina, Aplysia vaccaria*, and *Pugettia producta* were common. *Chondracanthus canaliculatus* and *Egregia menziesii* were abundant. *Phyllospadix sp*. was very abundant with some bleaching occurring in the upper intertidal area. Red sponges, tunicates, *Petrolisthes sp*., and monkeyface pricklebacks (*Cebidichthys violaceus*) were observed. One monkeyface prickleback approximately 20 in. was observed stranded on the eelgrass. *Asterina miniata* was seen under rocks.

Photoplot summary- Mean percent cover by zone at Northwest Talcott, Santa Rosa Island

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	61.6	17.6	3.0	15.0	0.0	1.4	0.4	1.0
Endocladia	39.4	4.0	25.6	21.8	0.2	8.2	0.8	0.0
Rockweed	27.8	0.2	5.6	63.2	0.0	2.2	1.0	0.0
Mussels	21.0	1.6	0.0	0.0	45.2	21.4	10.8	0.0

Black Abalone at Northwest Talcott, Santa Rosa Island (30 minute search)

Count	MeanSize	StDev	MinSize	MaxSize
3	150.67	7.51	143	158

Black Abalone percentage within size classes at Northwest Talcott,

Santa Rosa Island

Plot	Count	%<45mm	%45-126mm	%127-145mm	%>145mm
Random	3	0.00%	0.00%	33.33%	66.67%

Owl Limpets at Northwest Talcott, Santa Rosa Island

Plot	Count	MeanSize	StDev	MinSize	MaxSize	Density
701	28	71.04	23.26	19	98	8.914
702	23	65.70	22.34	15	93	7.323
703	26	55.54	17.77	15	78	8.278
704	23	51.87	22.30	17	82	7.323
705	23	46.22	19.64	18	79	7.323

Owl Limpets percentage within size classes at Northwest Talcott, Santa Rosa Island

Plot	Count	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm
701	28	3.57%	10.71%	0.00%	0.00%	3.57%	21.43%	14.29%	28.57%	17.86%
702	23	13.04%	0.00%	0.00%	4.35%	4.35%	30.43%	21.74%	21.74%	4.35%
703	26	3.85%	7.69%	7.69%	19.23%	3.85%	30.77%	26.92%	0.00%	0.00%
704	23	8.70%	17.39%	4.35%	13.04%	8.70%	21.74%	17.39%	8.70%	0.00%
705	23	4.35%	21.74%	21.74%	4.35%	17.39%	17.39%	13.04%	0.00%	0.00%

Mobile invertebrate counts in 50 x75 cm photoplot areas at Northwest Talcott1/20/2000

zone	Plot No.	Tegula funebralis	# Acanthina sp.	# Ocenebra circumtexta	# Nucella emarginata	# Limpets >1 cm	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	560	1									
Barnacle	561					1					1
Barnacle	562	3				5	1	1			
Barnacle	563	13		1		2			5		1 M.m.
Barnacle	564	2							1		
Endocladia	555								1		
Endocladia	556	1									
Endocladia	557	2				6	1				1 P.c.
Endocladia	558		3	3		5	2		1	2	
Endocladia	559		1			17		5			
Rockweed	565	4				15			1		1 P.c.
Rockweed	566	10				7			4		3 P.c.
Rockweed	567	22	3			10			1		
Rockweed	568	2		1		1			1		
Rockweed	569					2		1			
Mussel	550			6	3	10	2	2		6	1
Mussel	551			1	2	3	6	5		7	1 P.o.
Mussel	552			1	3	5		4	1	8	1 P.c.
Mussel	553				1	4	4	5		26	1 P.c.
Mussel	554			1	4	7	3	4		24	3 P.c.

* *Siphonariabranneri* included in Limpet total. (Other species= M.m.- Mopalia sp., P.o. *Pisaster ochraceus*, P.c. *Pachygrapsus crassipes*)

Santa Barbara Island
January 18-20, 2000
(Database event #1999-L)

PERSONNEL:Dan Richards, Marine Biologist, Channel Islands National Park

PROCEDURE: The Ocean Ranger arrived at Santa Barbara Island about 1100. Dirk Rodriquez came out also to shoot photopoints and locate vegetation transects. Photoplots were photographed and scored. Species were censused in the plots and a general species list was made for the site. Mobile invertebrates were counted in the first three plots from each zone. Abalone and sea stars were counted in a 30-minute search. The temperature logger from Landing Cove was downloaded. Comparisons of this sample with previous years should take into account that most fall sampling is done in late October.

RESULTS:
January 18, 2000, Landing Cove: low tide –1.0ft at 1344 hrs, air temp 19 C, water temp 14.5 C, wind 3-5 mph NW, calm seas and no surge.

The site was worked from 1220-1730 hrs. About 30 sea lions were present on the northern reef. One Wandering Tattler, two Black Oystercatchers, and 13 Western Gulls were present in the intertidal.

All the plots were easily found. Many of the number tags can no longer be read or are missing entirely. Only the bronze bolt of plot 320 was located but the reef there is very uniform in slope and cover.

There are a number of open patches throughout the mussel bed in the south sector of the site. Purple sea urchins and sea stars were both abundant. During the 30-minute search, 386 *Pisaster ochraceus* were counted over the south section. In the 16x1.6 m sea star transect, 32 *P. ochraceus* were found. Many small sea stars were found. Sea star colors were very diverse with brown, orange, blonde, and purple stars present.

Four small black abalone (45, 60, 60, 55 mm) were found in the mussel bed. All appeared to be healthy. All were found at the margin of a small clearing in the mussel bed usually tucked up next to the mussels. All were at about the mean low tide level. Abalone were never common at this site and this may be the most ever found here.

Surf grass *Phyllospadix torreyi* is well up into some of the red algal turf plots, reaching 68 and 70% in plots 323 and 322. The condition of the surf grass was somewhat bleached out in these plots however. Red algal turf was fairly thin with a mean cover of only 53%. *Chondracanthus canaliculatus* was the dominant algae in this zone. Sea lions commonly use this reef laying on top of some plots, particularly 320 where the turf cover was high (79%) but the turf is short. Misc. algae (mostly corallines) covered the rest of the plot.

Photoplot summary: mean % cover by zone at Landing Cove, January 2000 (20 plots)

ZoneName	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Turfweed	Misc Algae	Misc Animal	Phyllospadix
Barnacle	56.4	29.0	3.4	0.0	5.4	0.0	5.0	0.8	0.0
Rockweed	37.4	0.8	0.0	13.4	3.0	0.0	43.4	2.0	0.0
Mussels	23.3	9.8	1.1	0.0	48.7	0.0	12.6	4.5	0.0
Red Algal Turf	1.6	0.0	0.0	0.0	0.2	52.6	10.4	1.0	34.2

Mobile invertebrate counts in 50 x75 cm photoplot areas at Landing Cove 1/18/2000

zone	Plot No.	Siphonaria brannani	# Littorina spp.	# Acanthina sp.	# Ocenebra circumtexta	# Ceratostoma nuttali	# Limpets	# Fissurella volcano	# Lottia gigantea	# Lepido-chitona sp.	# Nuttalina sp.	Other species
Barnacle	315	37	>200	0	3	0	8	0	0	0	1	
Barnacle	316	40	>200	0	6	0	21	0	0	14	30	
Barnacle	317	>100	>200	3	17	1	35	0	0	25	17	
Mussel	325	0	0	0	8	0	23	1	0	0	12	
Mussel	326	0	0	0	2	2	6	7	0	1	0	20 S.p. 3 P.o.
Mussel	327	0	0	0	13	1	15	7	0	0	5	4 S. p. 2 A. v.
Endocladia	320	0	1	0	0	0	0	5	0	0	0	
Endocladia	321	0	0	0	0	0	0	1	0	0	0	
Endocladia	322	0	0	1	0	0	2	2	0	0	2	
Endocladia	323	0	0	0	0	0	0	1	0	0	0	
Endocladia	324	0	0	0	0	0	0	3	0	0	0	
Rockweed	310	*	17	3	2	0	61*	0	0	3	30	
Rockweed	311	*	20	1	0	0	56*	0	0	0	47	1 P.c.
Rockweed	312	*	3	0	0	0	23*	0	0	0	14	

* *Siphonaria branneri* included in Limpet total. (Other species= S. p. *Strongylocentrotus purpuratus*, P.o. *Pisaster ochraceus*, A. v. *Amphissa versicolor*, P. c. *Pachygrapsus crassipes*)

January 19, 2000, low tide –1.4 ft at 1429 hrs, wind 5-8 mph W, seas calm, occasional 4-6 ft swell.
Sea Lion Rookery could not be accessed because of brown pelicans nesting on the slope above the site. Most nesting activity was in the gully and the slopes of Graveyard Canyon. A check from offshore on 1/20 confirmed nests throughout Graveyard Canyon and all along the lower slope. I estimate at least 200 to 300 active nests. Eggs could be seen in some of the nests. About 140 sea lions were present in the immediate area. There was pelican activity in Cat Canyon and there appeared to be nests though this wasn't positively confirmed.

I checked the Cave Canyon intertidal site where the BLM site was. I found at least two sets of markers (washers, eyebolts). The site is about 20 m south of the mouth of the Canyon. The slope and fauna were similar to the south section of the Landing Cove site. *Pisaster ochraceus* were abundant. *Littorina spp., Tetraclita rubescens, Mytilus californianus,* and *Nuttalina californica* were abundant. Algal coverage was low with *Endocladia muricata* in the high intertidal, coralline algae throughout, and *Eisenia arborea* and *Halidrys dioica* in the lower intertidal.

I went back to the Landing Cove and scored plots 326 and 327, since they were not scored the day before. There were 44 sea lions and one elephant seal present on the intertidal site and another 50 more sea lions in the cove area.

Return to Ventura early on 1/21.

Temperature logger data from Landing Cove 3/2/99-1/19/00.